

ZANZIBAR PROTECTORATE

ANNUAL
MEDICAL AND SANITARY REPORT

FOR THE

Year ended 31st December, 1935

PRICE: Shs. 3/50

OFFICE OF THE
DIRECTOR OF MEDICAL SERVICES,

Zanzibar, 25th April, 1936.

Sir,

I have the honour to submit for the information of His Excellency the British Resident and for transmission to the Right Honourable the Secretary of State, the Medical Report on the Health and Sanitary Conditions of the Zanzibar Protectorate for the year 1935, together with the Returns, etc., appended thereto.

I have the honour to be,

Sir,

Your obedient servant,

W. L. WEBB,
Director of Medical Services.

THE HONOURABLE,
CHIEF SECRETARY TO THE GOVERNMENT,
ZANZIBAR.



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SECTION I.

ADMINISTRATION.

GENERAL REVIEW.

The year 1935 has been one of steady, if slow, progress and although no great changes have been attempted and none of the larger schemes have been brought to fruition, an advance has been made all along the line both in respect of knowledge of the problems awaiting solution and of measures to be taken for their alleviation. A short review of the more important matters, some of which are dealt with in the body of the report, is given below.

Welfare.—As a knowledge of conditions under which the peoples of the Protectorate live becomes wider, the question of nutrition emerges as one of greater and greater importance. In the sections of this report dealing with prisoners and school children, there is incontrovertible evidence that under-nourishment exists amongst the general population, rural and urban, and that it is both quantitative and qualitative. The first is largely due to poverty following the depressed economic state of the Protectorate and the second is at least partly due to ignorance. The problem is therefore not solely a medical problem, but one that requires concerted action of all departments concerned with native welfare. With it are bound up broader problems concerning other aspects of village life and it is evident that the aim must be to attain a general raising of the economic and hygienic standards of the native.

Following a visit of the Chief Inspector of Schools, the Superintendent of Female Education and the District Commissioner, Zanzibar, to a conference held in Salisbury on Jeanesism, this subject came to the fore and was recognized as a hopeful channel of effecting the aims referred to above. It was decided to establish a Jeanes School, with the objective, *inter alia*, of establishing a unit at each of the headquarters of the mudirs, which would be able to advise and assist the native populations on most matters relating to improved ways of living. The staff, who are to function as technical assistants to the mudir or chief and in the closest co-operation with the school and Jeanes teachers, are to consist of two specially trained natives, one of whom will be concerned principally with matters relating to health and the other with agricultural problems. Both will be welfare workers, and the assistance they will render will be eminently practical and will include the distribution of selected food crops for planting, advice and practical assistance in building and siting houses, latrine construction, water supply, mosquito control and it is hoped, some system of co-operative buying of such articles as cement, door and window frames, etc.

Such briefly is the scheme, but it will take years to materialize, for by the end of the year it had hardly passed the stage of consideration. In the meantime, not very much can be done to bring relief to the population generally. An improvement effected during the year on the prison dietary led to the most gratifying results though it is still too early to assess the true value of the new diet. Much more important is the question of the school children. Nothing was done during the year, but it is evident that full consideration must soon be given to the ability of government to provide free meals for school children whose nutritional condition is unsatisfactory.

Staff.—There was no alteration in the numbers of the European staff during the year, but one of the vacancies in the Nursing Sister staff was filled by a sister who was a certificated Health Visitor, and arrangements were made for one of the existing sisters on leave to take the course at home with a view to obtaining the certificate. Although the machinery does not yet exist to allow them to exercise their functions as Health Visitors to the full extent, there are indications that this training and the outlook it engenders will be of the greatest benefit to the Nursing Staff.

Two young Arabs, who completed a course of five years instruction at Mulago Medical School, Uganda and who successfully passed their final examination (one being awarded the Keane Medal in Medicine) returned to Zanzibar and worked at the hospital throughout the year, where they gave complete satisfaction. The Medical Practitioners and Dentists Decree was amended to allow them to be licensed under its terms, and throughout the year they have performed the duties usually undertaken by Asiatic Sub-Assistant Surgeons, thus allowing the post of Assistant Surgeon to be abolished on the retirement of the holder.

Medical Education of Native Personnel.—It was emphasized in last year's Report that one of the greatest needs of the Department was a better educated native personnel, both for employment in the hospitals and in the rural dispensaries. There existed, however, no suitable institution where such personnel could be taught, and the service was insufficiently attractive to the type of native required. Regulations governing a "Zanzibar Native Medical Service" were drawn up and approved, to serve as a framework through which organized education could operate and the terms of which, it was hoped, would prove attractive to the desired type of native. A scheme was also prepared and approved, to convert an old building adjacent to the hospital into an out-patient department large enough to serve as a training ground and a hostel for the students. Both projects, as yet unproved, may have to be modified. The next step was to find pupils to teach and this proved a stumbling block. It was felt that, as the trained pupil would be required to exercise his art amongst rural natives, he should be recruited from amongst rural communities, with whom he would have a natural sympathy lacking in the case of town boys. However, it was found that very few, if any, rural boys received a general education in excess of Standard II, and that this was insufficient to allow them to take advantage of the training to be afforded them. It was felt that boys accepted for training should have reached Standard IV at least and preferably Standard VI. This degree of education was only attainable in the Government School in the town of Zanzibar, and all the pupils were town boys. Only a proportion of them were natives, the greater number being Arabs who were not only unlikely to be attracted to the service, but frequently would be unsuitable as well. The town natives who had reached the requisites standard of education were few, and although employable in the town Hospital were not regarded as suitable for work in rural areas for reasons already referred to. Therefore, for the moment, the supply of suitable and teachable natives was restricted to a few town boys, only a limited number of whom would be employable.

At this time, the Education Department opened a rural school at Dole with a view of affording education up to Standard VI for village boys. The school was a boarding school, and designed to accommodate sixteen pupils a year for a four years course, i.e. 64 pupils in all, with an output of 16 a year. With one exception, all the pupils admitted in the first year were Arabs, who were not likely to afford many recruits for the prospective "Native Medical Service". Moreover, it was anticipated that at least 20 pupils a year should be admitted to the "service" and so obviously the school was hardly sufficient even in the most favourable circumstances, to meet the requirements of the "service". Finally the fees were in excess of what native parents could afford. After consideration of this aspect of the situation, government decided to double the size of the school, making 32 vacancies a year available for native boys, and reducing the fees for them to Shs. 3 a month, as a maximum, or any other less sum that the parents could afford. It is thus hoped that in a few years time there will be at least a sufficiency of suitable recruits to allow organized training in medical subjects to be profitably undertaken.

The position with regard to girls was even worse. Female education is provided at the Government Girls School in the Town of Zanzibar, to which is attached a hostel for a limited number of boarders. Nearly all the girls are the children of well-to-do Arabs, or their domestic dependents, and none are likely to be attracted to or available for a Nursing or Midwifery Service. No other education is open to native girls in the Protectorate except at the Koran

Schools, where the Koran only is taught. Although no Midwifery or Nursing Service was actually considered in detail, as in the case of the boys, the urgent necessity of such services in the future was always borne in mind and as it was abundantly evident that under existing conditions there would never be any native girl fitted to benefit from vocational training on account of the total absence of general education, it became necessary to consider how best the material for future training could be obtained. In conjunction with the Education Department a scheme was prepared and approved by Government whereby the capacity of the hostel should be increased by 16, and arrangements were made for the admission of little country native girls of 10 to 12 years of age at reduced fees or free, as in the case of the boys. They will receive a six years education and should attain to Standard IV to VI. They will, on completion, of course be free to choose what career they like, and many no doubt will be lost by marriage, but it is hoped that the influence and the atmosphere of their surroundings will turn some of their minds to a career in the Medical Department. Our first little potential midwife was admitted to the school during the year. She came from Pemba and she was, I believe, eight years of age.

Maternity and Child Welfare.—These activities still remain principally under the care of the Zanzibar Maternity Association, although cases are seen at and admitted to all hospitals. In Pemba the activities of the government hospitals in this direction have increased in a very satisfactory manner. Arrangements have been made for a lady doctor to join the staff in 1936 and a large part of her duties will be directed to inaugurating such a service at the Zanzibar Hospital. Facilities are very poor however, and any significant development must await their improvement. A full service cannot be expected until the little girls referred to in the preceding paragraph have finished their general education and are ready for vocational training, but during this period of waiting it is felt that much can be done, and needs to be done, in a quiet way, to win the confidence of native women and to encourage them to attend hospitals and dispensaries to a far greater extent than they do at present. The Health Visitors and the Lady Doctor should be invaluable in attaining this end.

School Medical Service.—The work of this service has been very satisfactory during the year and facts have been brought to light, particularly with regard to malnutrition, that will allow effective measures to be taken to improve the health of this small but important section of the community. Medical Officers and the Dental Surgeon have worked in close co-operation, and though the results of their efforts towards improvement of personal hygiene of the children are often disappointing, that some improvement occurs can hardly be doubted. Persistence over a long period will, it is confidently anticipated, be followed by considerable improvement.

The work of this service at present is restricted, unfortunately, almost entirely to boys, as Mohammedan susceptibilities might be offended by the examination of girls by male Medical Officers. This will be another fruitful field for the Lady Medical Officer to explore.

Vital Statistics.—A new quarterly form of vital statistics return was introduced, which, though it made available knowledge which had previously been hidden in the registers, did nothing to improve the accuracy of registration. The importance of accurate registration in a country such as Zanzibar can hardly be overestimated, because without it the knowledge of vital trends is so scanty that the direction in which our energies can best be applied remains unknown.

Valuable investigations were undertaken in the field by Medical and District Officers, but such enquiries have their limitations. However, it appears to be established that the Infantile Mortality Rate is over 200 per 1,000 live births. A very disquieting state of affairs that emerged from these enquiries was the apparently appallingly high still-birth rate. No cause could be definitely ascribed for this, though the possibility of syphilis being more widespread than is generally believed must be borne in mind. The evidence available suggests that the native population of Zanzibar Protectorate may be a diminishing one.

Malaria.—The Malaria survey undertaken from funds provided from the Colonial Development Fund proceeded until Dr. D. D. McCarthy went on leave in August. Considerable attention has been paid to anti-malarial measures in the township of Zanzibar and at varying distances from its boundaries and it is gratifying to note that the number of cases recorded in the township dropped from 4,400 in 1934 to 2,400 in 1935, although the last was a year of very severe rain. It is too early to claim that this is a result of measures taken, but the position is at least hopeful. In addition to the usual bush clearing, oiling, etc., steps were taken to prohibit quarrying within the township, which had been a very fruitful ground for anopheles breeding. It was also decided to prohibit the keeping of cattle in the township, and a years notice which expires in 1936, was given to cattle owners. This necessitated making plans for abandoning the Government Dairy (so called, though the government rented the buildings to dairymen and did not undertake the business itself) which included the provision of facilities for cattle keeping outside the township. The necessity for this measure was that the cattle grazed over the low lying swampy areas of the township and their hoof marks provided profuse breeding grounds which were extremely difficult to control. It is hoped that the effect of their withdrawal from the township will be reflected in the 1936 returns, though as this is not likely to happen until after the main rains, the full effect is not expected until 1937.

Leprosy.—At the beginning of the year the main leper settlement of the Protectorate was situated on Funzi Island, a rather desolate coral island lying off the West coast of Pemba affording little shade or comfort to the lepers, who were housed in barrack like back to back quarters in the formation of a square. Funzi was hated by the lepers and its existence lead to much evasion of the disease, not only because of the discomfort of the place and its prison like qualities, but because in many instances, particularly in the case of lepers from Zanzibar, it was impossible on the grounds of expense, for the patient's family ever to visit him. Other objections to the island were the difficulty of providing adequate medical supervision and the necessity for two lady members of the Universities Mission to reside on the island without being in adequate communication with the main island. A scheme was put forward and adopted by government whereby Funzi was to be closed and the lepers were to be accommodated in village settlements on each of the two main islands, where they would be readily accessible to their friends and relations.

A small leper colony, supposedly for burnt out cases, existed at Walezo, four miles from Zanzibar Town, and as a first step the Zanzibar lepers on Funzi were evacuated to Walezo, to their great content. A number of mainland lepers were found both at Funzi and Walezo, and arrangements were made for their repatriation in the case of those who desired it. To effect this, it was necessary to charter the H.H.S. *Cupid* which conveyed the lepers to Mombasa and Dar-es-Salaam where they were handed over to the Medical authorities. The inhabitants on Funzi were thus considerably reduced, and to facilitate the removal of the colony a further number of lepers were released on parole in suitable cases. Difficulty was experienced in finding suitable land in close enough proximity to medical headquarters to allow of adequate control and supervision, but by the end of the year this was overcome, and financial provision had been made for the establishment of the new colonies in 1936. So at the end of the year Funzi was still the main leper settlement of the Protectorate, but much reduced, and with the stage set for the change over at the beginning of the next year.

Dr. T. B. Welch, who had been investigating the leper position in Pemba under the auspices of the British Empire Leprosy Relief Association, returned to England in 1935.

Pemba.—There are three small townships in Pemba, each of which at one time was the headquarters of a district. Pemba to-day is one district, and the European staff have been withdrawn from one of the townships, Mkoani, where the hospital remains under the charge of a sub-assistant surgeon. Of the remaining two, there is a doctor and a nurse at Chake Chake, and representatives of the Agricultural, Legal and Public Works Department. The other;

Wete, is the administrative headquarters of the island, and a doctor and a nurse are also stationed here. It was decided to centralize medical activities at Wete and arrangements were made for this to be put into effect in 1936, when two doctors and two nurses will be stationed at Wete, and Chake Chake hospital left to the care of a Sub-Assistant Surgeon as in the case of Mkoani. The proposed leper settlement is at Makondeni, four miles from Wete, on a lovely site, well watered and shady, which was previously a government plantation of the Agricultural Department.

Office Organization.—Much time during the year was spent in compiling Standing Orders for the Medical Department. Orders had previously existed, but they were very incomplete and were available only in type written manuscript. It was felt that if a complete set of orders were compiled, subsidiary to General Orders for the Protectorate and dealing principally with such matters which concerned members of the Medical Department primarily and particularly, and if these orders received the approval of government and were printed and published in book form, much correspondence, much argument and many mistakes would be avoided. The Orders were written and approved and now await printing.

An innovation which caused some discontent amongst the public and which is reflected in the reduced number of patients seeking treatment this year was that of drawing up a scale of charges for all who attended hospitals or dispensaries. In the past payment was restricted to in-patients, and only a selected few of these. Considerable abuse of government charity was evident and was exemplified in one case where a patient presented himself for treatment with a certificate from his particular society to say he was too poor to afford any payment, in a coat on which golden sovereigns had been substituted for the usual buttons affected by his presumably more wealthy compatriots. The scale of charges was drawn up with great care and provided complete safeguards against anyone being refused treatment of any sort on account of lack of ability to pay, and against anyone being required to pay more than they could reasonably afford. The result was a considerable and anticipated decrease in the number of patients who sought treatment from 159,686 in 1934 to 130,115 this year, and an increase in revenue from £1,380 to £1,699. It is believed that those who refrained from seeking relief were mainly restricted to that class of patient who has become so hospital minded that a bottle of medicine, if free, is sought for every minor malady or discomfort, and not to those who are in real necessity of medical assistance. It is also believed that insistence of appropriate payment in all suitable cases will lead to a higher appreciation of the treatment afforded. It may be added that the maximum fee chargeable at a sub-dispensary for any form of treatment is two pice, or five cents of a shilling or one half-penny.

Under the Public Health Decree a Central Health Board consisting of officials and non-officials of various races, was appointed to advise the Director of Medical Services on questions affecting the public health. As many of the functions of this board were taken over by the more newly appointed Town Board under the Towns Decree, the former decree was amended and the Central Board of Health ceased to exist.

Town Planning.—Much consideration has been given during the year to town planning, but little was achieved. The necessity for some measure of this sort can best be judged by a reference to the air photographs of the stone and native town which appear in the body of this report. Unfortunately, no modern map of the town exists, and until this is available, it is impossible to proceed. After consideration, it was decided that such a map could best and most cheaply be provided by air photography, and arrangements were made for this to be undertaken next year.

Sport.—The Medical Department in the past has made efforts to run some sort of a sports club for its employees, but without much success. Believing that such a club or association embracing all employees makes for unity of the department and contentment of its members, efforts were made once more to establish a club on a footing which would make for solidity. Enthusiastic

helpers came forward, both from within and without the department and an organization evolved in which every type of member has representation. Funds were a trouble, owing to the poverty of the vast majority of the members who are in receipt of about thirty shillings a month. It was eventually arranged that European members should be privileged to pay Shs. 3 a month, though they are not expected to function as players, but rather as spectators, trainers and organizers, and that for other members the subscription should be graded down to a minimum of four annas, or fourpence halfpenny a month. Government kindly allowed the club to use the old harbour works excavation as a sports ground and a football field, a very good one, was soon laid out, with room for another. Members joined in sufficient numbers to allow nine teams to be formed by the end of the year. We are not good enough yet to join the Sports Association League, but hope to be so in 1937. As funds become available, we hope to include cricket, hockey perhaps, volley ball and field sports in the programme, and indeed it was from the partial success during the year of a tug of war team trained by our most enthusiastic non-medical department member, which started the whole idea. Towards the end of the year, the club looked as if it were firmly established.

The Annual Report is the work of many officers each dealing with sections with which they are most familiar, subject to general editing. To avoid discontinuity officers have not signed the parts of the report they have written, but my thanks are due in particular to Dr. W. A. Young, Acting Senior Medical Officer, Dr. H. G. Wiltshire, Pathologist, and Dr. H. C. E. Quin, District Medical Officer and School Medical Officer, Zanzibar.

(A) STAFF.

Principal Appointments, Promotions, Changes, etc.

<i>Appointments:—</i>		Date.
Miss J. A. Cooke, to be Nursing Sister	...	8- 8-35
<i>Promotions:—</i>		
Dr. S. M. Vassallo, to be Senior Specialist Officer	...	19- 6-35
<i>Acting Appointments:—</i>		From. To.
Dr. W. A. Young, to act as Senior Medical Officer	... 2- 6-35	31-12-35
Dr. W. A. Young, to act as Medical Officer of Health	... 10- 5-35	31-12-35
Miss M. A. McKie, to act as Matron	... 1- 1-35	27- 5-35
<i>Termination of Appointments:—</i>		
Miss M. A. Brewster, Nursing Sister	...	9- 1-35
Miss M. A. McKie, Nursing Sister	...	7- 8-35
<i>Transfers:—</i>		
Dr. W. H. Smith, Medical Officer, to be Medical Officer, Tanganyika Territory	...	1- 2-35

(B) LEGISLATION AFFECTING PUBLIC HEALTH ENACTED DURING THE YEAR.

Government Notice No. 18.	Appointment of Cemeteries under the Public Health Decree, 1929 (Cap. 60).
Government Notice No. 20.	Zanzibar Quarantine (Amendment) Rules, 1935.
Government Notice No. 38.	Appointment of a Cemetery under the Public Health Decree, 1929 (Cap. 60).
Government Notice No. 64.	Appointment of a Cemetery under the Public Health Decree, 1929 (Cap. 60).
Government Notice No. 65.	Appointment of Recognized Family Vaults under the Public Health Decree, 1929 (Cap. 60).
Government Notice No. 73.	Appointment of Recognized Family Vaults under the Public Health Decree, 1929 (Cap. 60).
Government Notice No. 77.	Appointment of Cemeteries under the Public Health Decree, 1929 (Cap. 60).

Government Notice No. 78.	Appointment of Recognized Family Vaults under the Public Health Decree, 1929 (Cap. 60).
Government Notice No. 81.	Appointment of Cemeteries under the Public Health Decree, 1929 (Cap. 60).
Government Notice No. 82.	Appointment of Recognized Family Vaults under the Public Health Decree, 1929 (Cap. 60).
Government Notice No. 99.	Dangerous Drugs (Amendment) Rules, 1935 (Cap. 64).
Government Notice No. 101.	Public Health (Prevention of Mosquito Breeding) Rules, 1935 (Cap. 60).
Decree	A Decree to amend the Dangerous Drugs Decree (Cap. 64).
Decree	A Decree to amend the Public Health Decree (Cap. 60).
Decree	A Decree to amend the Medical and Dental Practitioners (Registration) Decree (Cap. 66).

(C) FINANCIAL.

TABLE OF ACTUAL EXPENDITURE.

		£	£	£	£
		1932.	1933.	1934.	1935.
Medical Department	...	51,727	49,294	37,846	36,575
Municipal Votes controlled by Medical Department	...	—	—	7,867	7,113
Grants-in-aid	...	1,665	1,711	1,675	1,716
Total		53,392	51,005	47,388	45,404
Total Revenue of the Protectorate		455,579	475,465	451,182	457,114
Percentage of Total to Total Revenue		11.72	10.73	10.50	9.93
Total Revenue of the Department		3,814	3,527	3,855	3,993

SECTION II.

PUBLIC HEALTH.

(A) GENERAL REMARKS.

Return for the Year.—The full returns of diseases treated for the year appear in Table A, Section VI, but a comparison of their main features with those for previous years is set out below :—

	1931.	1932.	1933.	1934.	1935.
New cases	140,698	140,175	157,167	159,686	130,115
In-patients	4,266	4,534	4,815	4,463	3,853
Total attendances	414,567	434,284	502,672	536,242	444,175
Surgical Operations (major)	1,224	1,393	1,320	1,299	1,151
Surgical Operations (minor)	2,684	2,812	2,340	3,370	2,683

A marked fall in the total number of patients in the Protectorate is the outstanding feature of the returns. The reduction was general at all institutions but most marked in Pemba. This is almost certainly due to the establishment at the hospitals this year of the practice of asking a small fee from all patients, with few exceptions. It is believed that the reduction has been mainly in cases coming up for medicine rather than because of actual disease, and that the principle of some payment for services received will prove not unworthy of its adoption.

There has been no appreciable change in the proportions in which the two sexes received treatment at government institutions, as the following table shows :—

	1930.	1931.	1932.	1933.	1934.	1935.
Males	69.8%	70.9%	73.2%	74.5%	73.6%	73.9%
Females	30.2%	29.1%	26.8%	25.5%	26.4%	26.1%

It will be interesting to see how the appointment of the first woman doctor on the staff in 1936 will affect the position, though no great immediate effect is anticipated. The percentages of females among the patients at the three chief hospitals for the year were :—

Zanzibar.	Chake Chake.	Wete.
22.38%	26.85%	19.15%

The following table shows the principal causes of deaths in government hospitals during the last five years :—

	1931.	1932.	1933.	1934.	1935.
Total deaths	442	222	387	446	418
Senility	101	86	103	127	75
Pulmonary tuberculosis	44	40	52	50	50
Pneumonia	41	12	15	26	20
Ancylostomiasis	15	11	16	19	17
Debility	24	20	26	19	41
Diseases of the Heart	16	9	14	15	11
Malaria and Blackwater	6	9	6	14	9
Nephritis	15	10	8	10	4

The only figures that throw light upon the incidence of disease throughout the districts and the communities of the Protectorate are, apart from the vital statistics and notifications of infectious disease, the statistics of cases treated at government hospitals and dispensaries. The hospitals receive cases, and particularly in-patients, from every part of the Zanzibar and Pemba Islands, but areas, such as the townships, may be found to furnish twenty-five times more patients in proportion to the population than the remote places of the eastern side of each island. The radius of the area from which the majority of patients are drawn is even more noticeably short for the dispensary than for the hospital. Road transport has of course brought the hospitals into closer association with points along the road system, but, still, the hospital and dispensary figures remain essentially samples from a wider population. The dispensary, moreover, that is far removed from the parent hospital tends to wane. Further development of transport, therefore, or some alternative method of development of

service, seems likely to have to precede more comprehensive medical care through the Islands.

The chief communities in the Protectorate may be enumerated as European, Bohora, Ithnasheri Khoja and Ismailia Khoja Indians, Hindus, Goans, Shihiri and Hadhramaut Arabs, Comorians, Muscat Arabs, Arabs of Zanzibar, Swahilis, Mainland Africans and Aboriginal peoples. The medical care of the European, Indian and Goan communities is partly in the hands of private medical practitioners and community dispensaries, especially in Zanzibar Town. In Chake Chake, too, there is an Indian Charitable Dispensary. The Shihiri and Hadhramaut Arabs and Muscat Arabs do not form as large a proportion of government hospital and dispensary patients as their numbers in the Protectorate warrant, but the number is growing. Thus by far the greatest part of the disease statistics is furnished at present from the some one hundred and eighty-six thousand Swahili, Mainland and local Africans, of these three African groups the last, who number according to the 1931 census over one hundred and sixteen thousand, are insufficiently represented at hospitals and dispensaries generally, but particularly in Pemba where there are over fifty thousand of them. In that island they are numerous as a populous fringe round the north, east and southern sides of the island, while the hospitals and road system are on the west or clove growing side of the island. It may thus be that the villages of these people, —compact in type, surrounded by a country of coral-limestone outcrop, of cattle, coconut palms and rice fields, and subsisting on milk, coconuts, grain and fish, and crowded with children many of whom suffer from yaws in babyhood will yet in the future alter the picture available of the Public Health of the Protectorate. In Zanzibar the older races of the island, as far as their more populous centres are concerned, are served by dispensaries. Where the population is scattered, however, the larger island provides probably some of the least touched of all the African villages in the Protectorate. It was in these villages on a low subsistence level that definite forms of avitaminosis were observed a year or two ago.

I. GENERAL DISEASES.

Diseases treated at the Government Hospitals and Dispensaries during the last five years are grouped in percentages of all cases treated according to the following table :—

	1931.	1932.	1933.	1934.	1935.
Epidemic, Endemic and Infectious ...	15%	12%	11%	13%	12%
Nervous System ...	7%	7%	6%	7%	6%
Respiratory System ...	9%	8%	7%	7%	8%
Digestive System ...	29%	31%	26%	27%	30%
Skin and Cellular Tissues ...	20%	23%	32%	29%	27%
External Causes ...	8%	8%	7%	7%	8%
Others ...	12%	11%	11%	10%	9%
	100	100	100	100	100

The Epidemic, Endemic and Infectious Diseases account for a smaller number of patients than has been observed for many years, but the proportion the group bears to all cases treated has not altered very much. The mortality in the group has fallen, in spite of a slightly higher incidence of mortality due to tuberculosis. The improvement in the mortality of the whole group is ascribable to the diminished incidence of blackwater fever and of pneumonia. The latter in many instances follows influenza in the Protectorate.

The numbers of cases and deaths for the whole of this group during the last five years is as follows :—

	Total of all new cases.	Epidemic, Endemic and Infectious Diseases.	Deaths.
1931	140,698	20,993	74
1932	140,175	17,140	69
1933	157,167	17,900	77
1934	159,686	19,833	90
1935	130,115	15,394	83

General Diseases.—There were 2,113 new cases in this group compared with 2,465 in 1934.

Twenty-five cases of malignant disease were recorded with 12 deaths. Of these cases 16 were males and 9 females, and 8 of the tumours were situated in the stomach or liver and 6 in the buccal cavity.

Avitaminosis is, in hospital cases, of indefinite identity. Cases of diabetes reached a total of 44, 39 of which were at the Zanzibar Native Hospital which has a diabetic clinic. Anæmia totalled 898 cases, but these were largely recorded by rural dispensers. Apart from the anæmia due to malaria or ancylostomiasis, a number of other anæmias and leukæmias are encountered from time to time. Liver soup is a routine part of the hospital dietary.

Affections of the Nervous System.—This group accounted for 8,438 cases as compared with 9,627 last year, but eye disease, 6,091 cases, constituted the major part of the group, while ear disease numbered 2,273.

The Special Eye Clinic at Zanzibar Hospital dealt with 1,023 cases and afforded 9,187 treatments during the year, including 58 operations. In addition it has carried out 296 examinations of policemen and candidates for government service.

Only 3 cases of locomotor ataxia, 3 of spastic paraplegia and 82 cases of neuritis are recorded. It cannot be said, therefore, that the indefinite nervous disease, characterized sometimes chiefly by polyneuritis and sometimes by inco-ordination and which is met with in some years in almost seasonal epidemicity, has been evident during 1935 to any marked extent.

Affections of the Circulatory System.—Only 960 cases were recorded and of these 700 were of the lymphatic system and largely filarial in origin.

Diseases of the Respiratory System.—10,275 cases for 1935 compared with 12,529 in 1934. The absence of any marked influenza epidemic has no doubt contributed to some of the decrease in this group also. Of 170 cases of pneumonia 95 were admitted to hospital, and 20 died.

The following table gives a comparison of the more important conditions met with in the group during the last five years:—

	1931.	1932.	1933.	1934.	1935.
Bronchitis ...	9,938	8,446	8,227	10,097	7,331
Pneumonia and broncho-pneumonia ...	295	186	126	229	170
Pleurisy ...	77	72	92	36	92
Asthma ...	593	471	435	437	419

The increase in pleurisy may be only a reflection of a greater readiness to diagnose in life a condition which has been shown in the post-mortem room for many years to be very common. Asthma is very common among all races in Zanzibar, but the impression is gained that it is less evident in recent years: the decreasing figures go a little way towards confirming this impression of diminishing incidence.

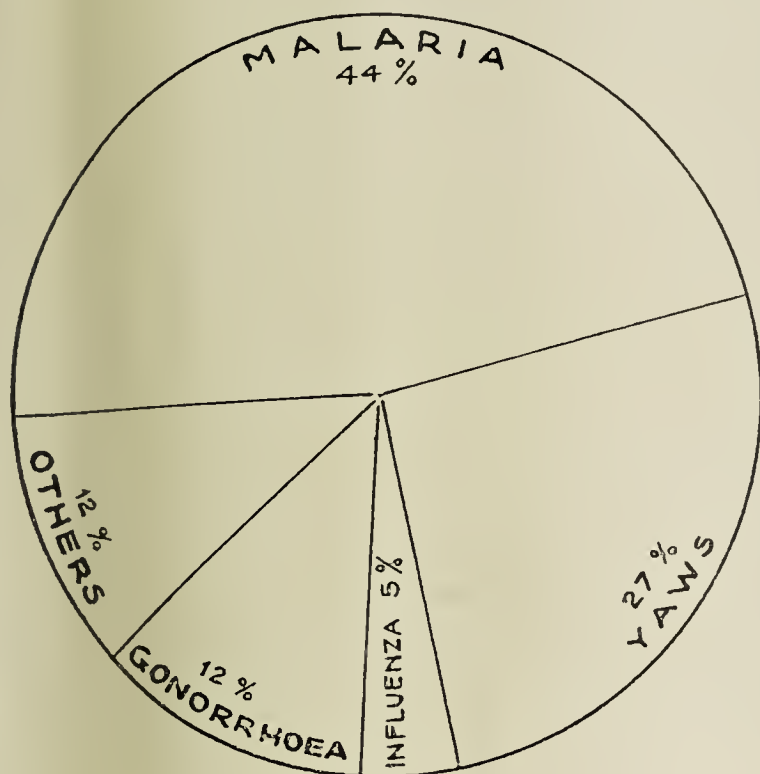
Diseases of the Digestive System.—38,569 cases, compared with 43,422 in 1934, comprised conditions in the numbers shown in the following table:—

	1934.	1935.
Constipation ...	16,654	12,539
Ancylostomiasis ...	12,577	13,665
Dental Caries ...	6,766	6,386
Colic ...	1,665	668
Affections of the Pharynx ...	1,515	1,366
Ascariasis ...	597	164

It would appear that ancylostomiasis is on the increase and ascariasis on the decrease, but the readiness or otherwise with which indefinite disease is ascribed to helminthic origin can be largely a matter of fashion.

Diseases of the Genito-Urinary System.—3,774 cases compared with 3,754 in 1934. The group includes 839 cases of schistosomiasis in the whole Protectorate as compared with 874 in 1934, and also 465 hydrocele cases (287 at the

The Proportion of Epidemic, Endemic and Infectious Diseases.

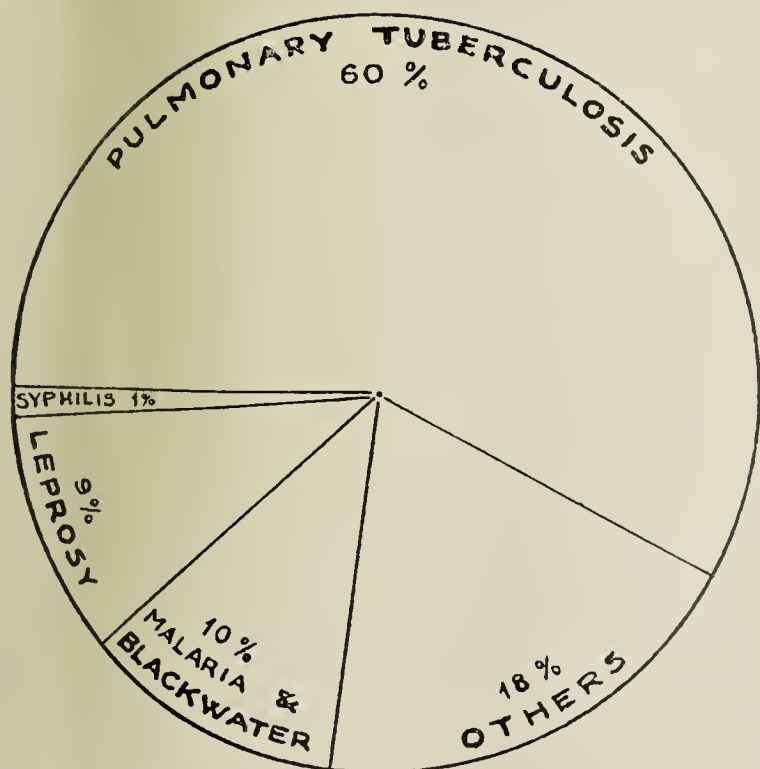


Total incidence 15,394

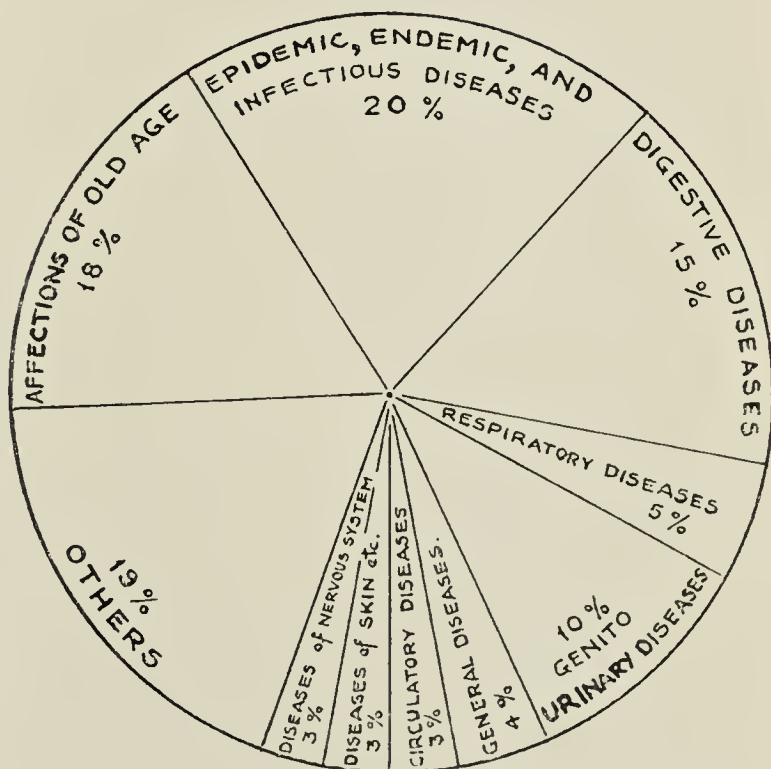
The Proportion of Epidemic, Endemic, Infectious, Systemic and other Diseases shown as Percentages of Total Cases.



Total incidence 130,115



Total Deaths 83



Total Deaths 418

Zanzibar Native Hospital) which were probably largely of filarial origin. Salpingitis and pelvic abscess accounted for 55 female cases.

Diseases of the Puerperal State reached a total of 135 cases, compared with 104 in 1934, while *disease of infancy* accounted for 25 compared with 9 in 1934. These figures do not include the maternity work carried out at the Maternity Homes.

Diseases of the Skin and Cellular Tissues.—This group reverts to the relative position it held before the ulcer epidemic began in 1933. The large decrease to only 35,186 cases this year from 45,505 in 1934 may be ascribed to the fairly progressive recovery that has taken place from the ulcer epidemic. The total ulcer figures for the Protectorate for the last three years are as follows:—

1933.	1934.	1935.
31,057	26,855	13,082

“Scabies”, or pustular dermatitis, on the other hand, which in 1934 was credited with 9,603 cases, is this year credited with a larger total, 11,517. The contrast is puzzling but a large bloc of the “scabies” figures is due to the activity of a travelling dispensary in Zanzibar conducted with Government drugs and with Government transport by the Catholic Mission.

There were 938 cases of tinea recorded.

Chigoes numbered 583 cases in place of 1,343 in 1934. This is a rather surprising variation, but it is in accord, so far as the period covers, with the impression that this pest is much less in evidence than it was ten or a dozen years ago.

Malformations.—Only seven cases appear in the returns.

Diseases of Old Age.—236 cases are recorded, of which 127 were admitted to the Walezo Infirmary, and among whom 75 deaths occurred.

Diseases due to External Causes amounted to 8% of all cases treated, their total being 11,016, or almost exactly the same number as for 1934. In the cases of 3,161 injuries, sharp instruments were specified as the cause, in 2,596 falls, and in 146, kicks and bites and stings from animals. Another 3,336 injuries are grouped as conditions varying from contusions to concussion but have no agency ascribed to them. At the smaller hospitals, such as Mkoari, the proportion of patients that are injury cases, is naturally higher than in the larger hospitals.

Diseases due to Other or Ill-defined Causes accounted for 9% of the records this year as compared with 10% in 1934 and 12% in 1931. The total figure was made up chiefly of 2,273 pyrexias of unknown origin and 1,084 general debility cases.

II. COMMUNICABLE DISEASES.

(a) MOSQUITO OR INSECT-BORNE.

Malarial and filarial infections account in the year 1935, as in other years, for the greater part of the cases of insect-borne disease treated at the Government Hospitals and Rural Dispensaries.

Malaria.—The following table of cases treated affords some indications of the incidence of malaria during recent years in the Protectorate as a whole:—

	1931.	1932.	1933.	1934.	1935.
Number of cases treated	10,146	8,369	7,536	9,796	6,902
Percentage of Malaria cases among all diseases treated	7.21	5.97	3.67	6.13	5.31

The number of cases treated at government institutions in the township of Zanzibar (i.e. The European and Native Hospitals, the dispensary attached to Mwembeladu Maternity Home, the School Clinic and the dispensaries attached to the Police Lines, Prison and Lunatic Asylum) are given below:—

1931.	1932.	1933.	1934.	1935.
4,679	3,375	3,580	4,473	2,452

The fall in the number of cases treated throughout the whole Protectorate is therefore very largely accounted for by the fall in the number of cases treated in Zanzibar Town. It is in the Town that particular attention was paid to anti-malarial measures during the year but, although it is hoped that this very conspicuous diminution in the incidence of the disease reflects the efficacy of the measures taken, it is as yet too early to be certain that this is so.

Blackwater Fever.—Only four cases of blackwater fever occurred during the year and all of these occurred in Pemba. All the cases followed repeated relapses or attacks of inadequately treated malaria.

Filariasis.—Malaria treatment figures, though based on malaria from restricted areas, are at least big enough to stress the importance of malarial infection in causing disease in Zanzibar. Filariasis—306 cases—on the other hand, fails to get its causative importance demonstrated properly, because it loses its name to a number of separately recorded conditions that are, nevertheless, each in its own measure, more or less certainly manifestations or sequelæ of filariasis. Operative work continues to be heavy at the hospitals and the bulk of it is still for such conditions as hydrocele, various lymphatic troubles, hernias, deep muscle abscess and elephantiasis. The proportion of operations for these conditions to all the operations performed has, however, diminished, and an impression is also gained that among the population in general such conditions are less in evidence than they were ten years ago.

Dengue.—There have been no known cases of dengue, sporadic or atypical, during the year.

Yellow Fever.—No cases have been recorded. The serum protection tests that were made in the native village in Zanzibar showed no evidence of past or present occurrence of the disease in the native population.

(b) INFECTIOUS DISEASES.

Some idea of the forms and extent in which infectious disease in the wider sense of that term has occurred during the last four years in the Protectorate may be gained from the table of figures below. The first eleven diseases in the table are among those that are legally notifiable in Zanzibar and so the figures for them include cases treated by other than government agency, but the figures for the remainder of the diseases shown are derived from government hospitals and dispensaries.

	1932.		1933.		1934.		1935.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Small-pox	...	—	3	—	—	—	—	—
Chicken-pox	...	46	25	—	76	—	68	—
Morbilli	...	—	—	—	—	—	105	—
Rubella	...	—	—	—	—	—	1	—
Whooping cough	...	125	201	—	70	—	81	—
Mumps	...	382	75	—	42	—	27	—
Diphtheria	...	—	—	—	—	—	5	2
Puerperal fever	...	—	—	—	—	—	13	2
Dysentery	...	130	73	5	69	—	48	7
Enteric group	...	4	6	—	8	3	21	2
Tuberculosis	...	238	244	52	202	50	161	70
Leprosy	...	86	47	2	50	11	21	8
Yaws	...	4,432	4,935	—	4,343	—	4,192	—
Syphilis	...	446	446	2	446	4	716	—
Soft chancre	...	46	67	—	44	—	49	—
Gonorrhoea	...	1,775	1,662	2	1,698	—	1,602	—
Influenza	...	559	984	—	2,216	—	793	—
Tetanus	...	2	3	1	4	2	6	2
Gas gangrene	...	—	—	—	—	—	7	—
Erysipelas	...	—	—	—	—	—	2	—
*Beri Beri	...	—	—	—	—	—	15	—
Septic meningitis	...	—	—	—	—	—	1	1

*Notifiable, but in general diseases group.

Notification numbers do not necessarily correspond with treatment figures. Particularly is this the case with a chronic disease such as tuberculosis, in which a patient may return repeatedly for treatment but for whom only the original notification may be accepted. A similar effect is noted in the cases of dysentery or enteric fever where transfer of patients from one care to another may artificially multiply institutional figures.

On the other hand, where an epidemic has broken out in the country side, cases visited by, or reported to, a rural dispenser may be notified without appearing in treatment returns.

The notification figures are therefore a truer guide than the treatment figures. They have also the added value of being prepared in close association with laboratory results which may or may not confirm a diagnosis that has already passed into monthly institutional returns. On the other hand laboratory figures may not be always read as case figures, for repeat examinations at long intervals are apt to be entered as separate cases in a country where many people share the same name, or similar names.

Treatment Figures, Laboratory Returns and Notifications should therefore be regarded as three separate lights upon the prevalence of epidemic disease, and notification figures, subject to their resulting from conscientious notification, provide probably the truest estimate.

Small-pox.—Of the major Infectious Diseases, only small-pox has appeared in the Protectorate within recent years, and during the past 2 years we have experienced complete freedom even from this disease.

Chicken-pox.—The disease was prevalent in Zanzibar Island especially during the months of October and November, 37 cases being notified from the Town and 26 from the Zanzibar Country Districts. Some of the cases showed very profuse rashes and were severe in character, so that a little anxiety was felt lest a case of the major disease of small-pox should escape detection through diagnosis as the lesser disease.

Measles.—Notifications of morbili reached a total of 105, all of them but 8 in Pemba where Mkoani District experienced an epidemic of 69 cases from April to June. Chake Chake suffered a smaller epidemic in January, and Wete had 18 cases in June and July.

Whooping Cough.—The notifications of this disease for Zanzibar Town reached a high figure in November. Many cases, however, seem not to have been notified, for government institutions record 134 cases as against 81 notifications received from all sources. Many notifications were received only at a very late stage in the illness, either because parents neglected to seek advice in the earlier phases or because, even when they did so, medical advisers apparently experienced difficulty in diagnosing with certainty the nature of the cough or were loth to notify the case until its obviousness became notorious. Thus, undoubtedly, schools—and particularly the little Koran schools—came to play a part in keeping up the chain of infections.

Apart from the cases from Zanzibar Town and a few in Chake Chake and Wete, there were only three cases recorded, all at Chaani, a remote country district with a good rural dispensary.

The noticeable prevalence of this disease both in Zanzibar and Pemba Island during the last few years only, which is inadequately reflected in the actual figures of the table, is a matter for some consideration.

Mumps.—Of the 27 cases all but one were from the rural districts. The exception was notified in Zanzibar Town.

Diphtheria.—A report on this disease is given by the Pathologist in Section IX. To a greater extent even than whooping cough it has to be regarded as a recent entry into Zanzibar's list of infectious diseases.

Dysentery.—Dysentery in Zanzibar is apt, from sporadic cases throughout the year but more especially occurring during the dry seasons, to leap suddenly into a threat of an institutional epidemic. Such an epidemic was undoubtedly aborted in May at the Central Prison. Cases tend to follow each other within hospital. The Pathologist shows in his report in Section IX the varied, and often mixed, flora responsible for the cases. Discrepancies between notification figures and treatment figures should be viewed in the light of the remarks on the subject earlier in this section.

Enteric and Food Poisoning Group.—All the 21 cases notified during the year as belonging to this group occurred in Zanzibar Town. The increase of the number over that of previous years is connected with the series of attempts made to link up cases and trace them to one or more definite sources. Carriers thus came to be found and interest in, and recognition of, the group were stimulated. The Pathologist gives an account of the investigations in Section IX.

Tuberculosis.—Of the 161 notifications, accepted and recorded for the Protectorate, 39 were diagnosed and recorded in Pemba. Much care was exercised throughout the year in Zanzibar to guard against the inclusion as new cases of old tuberculosis patients already notified in earlier years from different sources, and there is a wide margin this year between the numbers of notifications accepted and of patients under treatment as new cases. Nevertheless, notifications in the Zanzibar Island—and these were almost all of town cases—amounted to 122, or more than in the previous year. Of these Zanzibar cases, 37 were notified by private medical practitioners and 85 from the Hospital or the Tuberculosis Clinic. The Mycobacterium tuberculosis was found in the sputum of 93 of the cases, and diagnosis of the others was based upon skiagram or convincing clinical evidence, notification of indefinite cases being rather discouraged. The distribution of tuberculosis in Pemba follows most markedly the avenues of more recent civilization, European and Indian, the disease being contracted in the larger townships, but being also evident in certain of the larger villages and at points along the shores of the western creeks and along the metalled roads. In Zanzibar the various races were responsible for the following proportions of the notifications:—

Race.	Population in Protectorate.	Percentage of cases actually accounted for by the race.	Percentage of cases that the race should have accounted for in propor- tion to its population.
Africans	... 183,952	55%	78 $\frac{1}{3}$ %
Indians	... 14,242	28%	6 %
Arabs	... 33,401	11%	14 %
Comorians	... 2,434	4%	1 $\frac{1}{3}$ %
Goans	... 1,004	2%	$\frac{1}{3}$ %

Forty per cent of the African patients belonged to definite mainland tribes and three African cases had entered the Protectorate within the last 4 years from Tanganyika Territory. Two of these men were repatriated and the third died. Many Indian tuberculosis cases return to India.

The following is a table of analysis of the Zanzibar cases of tuberculosis according to age groups among males and females:—

Age Group.	Male.	Female.	Total.
Years 1-10	1	3	4
„ 10-20	10	8	18
„ 20-30	33	10	43
„ 30-40	34	9	43
„ 40-50	11	1	12
„ 50-60	1	1	2
All ages	90	32	122

There were only three cases of tuberculosis of bones and only four of intestines or peritoneum.

The Medical Officer in Wete, commenting on the high incidence of tuberculosis in Wete, express a wish that Pemba obtain its own special accommodation for cases of this disease.

Leprosy.—It is difficult to demonstrate from any figures available the extent to which this disease is maintaining itself by new infections. Procedure in the case of occurrence is as follows:—

Alleged cases of the disease are classified on examination as Unconfirmed, Suspected or Observed Lepers (undoubted lepers whom the examining officer does not consider it necessary to segregate in the Leper Asylum) and Asylum Lepers (the lepers that such an officer does see fit to send to the Leper Asylum). Confirmed cases should be notified, but it would seem that notification of leprosy as one of the infectious diseases is not universally carried out in the Protectorate. The influence of the personal factor is noticed particularly in all dealings with this disease, high figures following one medical officer and low ones another. It can, nevertheless, probably be stated that leprosy is more prevalent in Pemba than in Zanzibar and that it contrasts with tuberculosis is not being a disease of the towns and recent civilization. Occasionally an Arab, sometimes of recent immigration, is the sufferer. Indian cases have been known. The majority of cases, however, are among Africans. The distribution of cases under care in a district is in part due to a marked tendency for lepers, especially when paroled from the Funzi Leper Asylum, to gravitate towards a particular locality and segregate their community of their own volition. New cases, when their connexions are traced, frequently lead to the discovery of one or more other additional cases.

Influenza.—No influenza epidemic occurred. Bad colds became epidemic once or twice in the various stations. The pneumonia figures at the hospitals for the year were:—

	Total cases seen.	Admitted to Hospital.	Deaths.
	170	95	20
As compared with in 1934	229	103	28

Ulcers.—Dr. W. A. Young, who undertook an extensive investigation into the question of ulcers in Pemba during 1933 and 1934, offers the following observations:—

“Ulcers and pustular dermatitis, with no definite culpable infective agent, are relegated to the group of diseases of the cellular tissues. The variability of incidence of these diseases, both seasonally and from year to year, seems to merit, however, classification of them with the infectious diseases. An investigation based on large numbers of ulcer cases over a period of many years demonstrates a marked seasonal variation and brings into prominence the epidemics, of which one in Pemba in the dry year of 1933 was of marked proportions. Recovery from this epidemic is still proceeding, though Chake Chake in Pemba is showing a rising ulcer figure again as the year ends. Papulo-pustular dermatitis, often a precursor of ulcers, is marked in hospital and dispensary returns under the terms “scabies” and “dermatitis”. Its incidence, also, rises and falls during the year.”

Venereal Disease.—The almost universality of past or present gonococcal infection in the Protectorate has often been stressed. Soft chancre is common. Lymphogranuloma inguinale does not appear in treatment records. The extent of syphilis is rather confused by the existence of yaws.

Seven hundred and sixteen cases recorded as forms of syphilis were treated in 1935 as compared with 446 in 1934.

Yaws is particularly a disease of the aboriginal peoples of Zanzibar and Pemba, among the babies of whom its exanthem is to be found. 4,192 cases were recorded as forms of yaws compared with 4,343 in 1934. The proportion of the yaws and syphilis group among total patients has thus increased. More extended use has been made of arsenicals in treatment of these conditions.

Beri-Beri.—The disease is notifiable in Zanzibar, but only 4 cases were notified during the year, and only 11 others occurred in hospital records. Mixed and indefinite forms of avitaminosis, though more recognized than ever, do not now usually receive the title beri-beri that many of them received formerly. No little epidemics of nervous disease, such as have been observed sometimes in previous years, attracted notice during the past year.

(c) HELMINTHIC DISEASES.

Ancylostomiasis.—The majority of native patients admitted to hospital, no matter for what condition, have ova of ancylostomes in the stools; perhaps in most of them on leaving hospital, despite the treatment that is directed in the case of nearly all patients against this disease, careful search would still detect eggs. Apparent heavy mortality in hospitals from the disease is due to the practice of recording ancylostomiasis as the name of the main disease present in those cases only in which it is evident in a severe form. In the stools of Indians, who come as patients for various troubles from the townships, ancylostome infection can hardly ever be found.

The disease, though prevalent generally in the country, is hyperendemic to the most marked degree in the more highly cultivated areas, particularly in the clove growing districts. The massive infestation that is met with frequently in Wanyamwezi labourers suggests that they in the past may have been instrumental in leading to the establishment of the infection in the clove growing areas.

Other Forms of Intestinal Helminthiasis.—The trichuris egg is as common in stools as the ancylostome one. Strongyloides is frequently encountered in fæces. The ascaris egg, though common, is not so frequently seen as the trichuris egg; symptoms of ascariasis are, however, common in young children, and are often associated with patients from certain localities.

Schistosomiasis.—The disease treatment figures for this disease, 692 males and 147 females, give no idea of the extreme prevalence of it among the children of Pemba. Kengeja Dispensary in Pemba treated 175 males and 101 females for it; Chake Chake Hospital 134 and 20; Chaani Dispensary, in the north of Zanzibar Island, 50 cases all males. The Zanzibar Native Hospital had 63 male and 5 female cases. In many of the villages in low lying valleys, or in the neighbourhood of streams and swamps in Pemba, passage of a little bloody urine towards the end of micturition is universal among the boys, and those boys without obvious blood in the urine generally show albumen or even eggs on investigation. In Zanzibar the disease is much less common.

The following account of cases is quoted from the report of the Medical Officer in charge of Chake Chake Hospital:—

“One or two schistosomiasis cases were admitted for retention of urine, and no obstruction was found on passing a catheter; eggs of *S. hæmatobium* were found in the urine and the retention did not persist after a few intravenous injections of antimony tartrate had been given, although catheterization had to be kept up, until the drug got a hold on the parasite.”

(B) VITAL STATISTICS.

I. GENERAL NATIVE POPULATION.

The estimated population of Zanzibar Protectorate at the end of the year 1934 was 244,104. During 1935 4,043 deaths and 3,636 births were registered whilst 12,872 immigrants and 13,522 emigrants were recorded. The estimated population of the Protectorate at the end of the year 1935 was thus 242,977 a decrease of 1,127. The crude birth rate for the year was 14.9 per thousand and the death rate 16.6.

	Estimated mid year population.	Birth Rate.	Death Rate.
1931	237,000	19.7	19.5
1932	240,000	18.9	19.3
1933	244,000	18.8	15.1
1934	244,000	18.3	17.6
1935	243,500	14.9	16.6

The figures given above carry little conviction and it must be presumed that the drop in the birth rate is more likely to be due to faulty registration than to an actual decrease in the number of babies born. At the beginning of 1935 a new quarterly vital statistics return was introduced for submission by the mudirs who act as registrars, and considerable pressure was brought to bear upon them through administrative channels throughout the year in the hope that registration would thus be rendered more reliable. This hope had not been realized but the new form does however, allow vital trends to be calculated of which nothing was previously known, although the inaccuracy of registration detracts very considerably from their value. It is possible now to give a Birth Rate, a Still Birth Rate, an Infantile Mortality Rate, a Maternal Mortality Rate, and a Death Rate for each Mudiria of the two islands, but the variation between Mudirias is so great as to render their publication unjustified. As an example, the mudirial birth rates vary from 6.7 to 31.6 and the death rates from 6.4 to 44.8 per thousand. In calculating rates in the following sections, the figures of the 1931 census are used, as there is no method which allows subsequent variations in population by race or geographical distribution to be calculated. This accounts for the slight discrepancy in rates that occurs. The information available in the census itself also restricts full use being made of the figures at our disposal.

During the year vital surveys were made of selected rural populations and the facts so obtained are compared with the registration returns under their appropriate headings. The most extensive of these surveys were undertaken in Pemba, by Dr. W. A. Young, who with his staff interrogated 1931 women representing a population of 5,318 and Mr. W. Addis, District Commissioner, Pemba, who enquired into the histories of 3,685 women. It is interesting to note that in these investigations no significant differences in vital trends could be demonstrated either by race or by geographical distribution. Dr. Young's investigations were particularly penetrating and took into consideration every phase of life of the villagers including diet, occupation, seasonal variation, prevalent diseases, etc. Still no significant variation emerged. Similar surveys are being undertaken in Zanzibar island on an even larger scale and as a routine duty of the rural sanitary personnel. The results are not yet far enough advanced to merit publication except in a comparatively few instances. These surveys are of undoubted value but they do not give the same information as reliable registration. It is almost impossible to arrive at even an approximate birth or death rate from them, but they do yield figures of the greatest value in assessing fertility and infantile mortality rates, although the figures obtained are not true annual rates, but average rates covering a period represented by the average length of adult life of the women interrogated.

The Constitution of the Population.—The 1931 census gives the total population of the Protectorate as 235,428 under the following races:—

Europeans	...	278
Arabs	...	33,401
British Indians	...	14,242
Portuguese Indians	...	1,004
Seychelles, Mauritians, Chinese, Japanese, etc.	...	37
Local Africans (five tribes)	...	118,199
Mainland Africans	...	68,267
Total		125,428

Any variation that has occurred since the time of the census is unknown. As was pointed out in the Annual Report for 1934, the intermingling of the races is so intimate that figures intended to demonstrate racial differences have very little, if any, value, except under very broad headings.

One of the facts which emerged from the 1931 census was the preponderance of males over females and this is described as being due to immigrant races. The census figures are:—

Males.	Females.	Total.	Females per hundred males.
112,893	107,011	219,904	94.8

and refer to all but Europeans and British and Portuguese Indians. The only comparable figures collected by survey are from the Mkokotoni Mudiria of Zanzibar.

7,258 7,380 14,638 101.7

and these, as do the census figures, refer to total Arab and African population of all ages. If however, children under 15 are excluded, comparison can be made between the census figures, figures from Dr. Young's surveys in Pemba and the England and Wales figures for 1934.

	Adult Males.	Adult Females.	Total.	Women per 100 men.
Zanzibar (1931 Census)	... 54,208	48,342	102,550	89.2
Pemba (1931 Census)	... 33,469	32,480	65,949	97.0
Pemba (Young's Survey)	... 1,598	1,319	2,917	82.5
England and Wales (hundreds)	... 145,967	163,449	309,416	112.6

There thus appears to be a considerable preponderance of men over women in the Protectorate and, although this is undoubtedly in part due to the immigration of male labour to the Protectorate, a study of the constitution of immigrants makes it quite clear that it does not wholly explain the discrepancy.

The question of the ratio of children to adults is of some interest and the following table has been compiled from available sources. The figures for the Dinkas were obtained from a paper on tuberculosis in this tribe written by Capt. S. M. Burrows, R.A.M.C. and published by the Medical Research Council.

	Females over 15 years.	Children under 15 years.	Total Population.	Children per 1000 adult females.	Children per 1000 Population.
Zanzibar (1931 Census)	... 48,342	35,191	137,741	728	255
Zanzibar Medical Survey 1935	... —	3,984	14,638	—	272
Pemba (1931 Census)	... 32,480	31,738	97,687	977	325
Pemba Young's Survey 1935	... 1,319	2,401	5,318	1,820	451
England and Wales 1934 (100's)	... 163,449	95,254	404,670	583	235
Dinkas	... 33,500	89,000	156,300	2,657	569

With the exception of Young's Pemba survey, these figures would appear to indicate that conditions in Zanzibar approximate more closely to those of civilized countries than to those of more primitive races. In this connexion it is of interest to note that the fertility rate (i.e. average number of pregnancies per woman, whether resulting in abortion, still birth or live birth) of the women interrogated by Young and Addis was respectively 2.8 and 4.5.

A small, but most interesting, survey of social features was undertaken by Mr. Wyatt of the Friends Mission amongst the natives living on the Mission estate at Banani in Pemba. They numbered 42 in all of whom 23 were men and 19 women. Fourteen of each sex were married to each other. Of the married men, three had had no previous marital experience, 4 had had one previous wife, two 2 previous wives, two 3 previous wives, and three, 4, 6 and 7 previous wives respectively. Of these 31 previous wives 27 had been divorced and 4 had died. Of the 9 single men, 4 had no marital experience, 3 had divorced one wife, one had divorced four wives, and one had been married twice but both wives had died. These 23 men (or 19 if the 4 without marital experience are excluded) had been married to 54 women, 14 of whom were still their wives, 34 of whom had been divorced and 6 of whom had died.

Three of the fourteen married women had had no previous marital experience, eight had had one previous husband and three had had 2, 3 and 4 respectively. Of the 17 previous husbands 11 had been divorced and 6 had died. Of the 5 unmarried women 3 had had one husband and two 2 husbands, seven in all, 6 of whom had been divorced and one of whom had died. These 19 women had thus had marital experience of 39 men, of whom 14 were still their husbands, 17 had been divorced and 7 had died.

These 42 adults had with them 9 children only, five of which were the offspring of existing marriages and four of previous marriages. It is possible that other children existed but had been taken by divorced partners.

This example makes it abundantly evident that the family unit is far too labile in Zanzibar to form a satisfactory basis of investigation into vital trends of population.

The following table gives the various rates for the whole Protectorate under broad divisions of race, and is calculated on the 1931 census population figures from information derived from the registration of births and deaths:—

	Population.	Birth Rate per 1000 Population.	Death Rate per 1000 Population.	Infantile Mortality Rate per 1000 live births.	Still Birth Rate per 1000 births and still births.	Maternal Mortality Rate per 1000 births and still births
Africans	... 186,466	14.5	18.6	86.4	16.8	10.2
Arabs	... 33,401	15.1	9.3	41.6	19.4	5.8
Indians	... 15,246	24.3	14.8	137.8	88.7	—
Others	... 315	20.0	10.8	15.9	—	15.9
All races	... 235,428	15.4	17.2	84.2	24.7	8.6

A comparison of the same rates for the two islands of Zanzibar and Pemba, but relating only to the combined population of Arabs and Africans is given in the next table.

Zanzibar	... 124,593	14.6	22.6	103.9	24.7	10.2
Pemba	... 95,274	14.5	10.2	47.0	7.2	8.6
Protectorate	... 219,867	14.6	17.2	79.3	17.2	9.5

It would thus appear that registration is more effective in Zanzibar than in Pemba but that it is by no means satisfactory in either.

Birth and Death Rates.—No additional information than that derived from the registers is available. Both would appear to be far too low when the type of population is taken into account, though in so far as the birth rate is concerned, there is a general belief that the African women of the Protectorate are reluctant to bear children, a relic no doubt of the old slave days. It is only too obvious that death registration is ineffective, particularly in Pemba.

Infantile Mortality Rate.—The figures derived from the registers are palpably unreliable. The results of the surveys referred to before are given in the following table. It has been pointed out that the resultant figures are not true Infantile Mortality Rates, but even so, it is believed they reflect the actual position for more accurately than the rates derived from the Registers.

	Women Interrogated.	Live births.	Deaths of infants of one year or less.	Infantile Mortality Rate.
Young's Survey, Pemba	... 1,319	3,188	605	190
Addis' Survey, Pemba	... 3,685	14,235	3,301	232
Three Fishing villages, Zanzibar	... 115	404	111	275
Total	... 5,119	17,827	4,017	225

The figures relate to mixed native population only.

Still Birth Rate.—The following table is derived from the same sources as the table above.

	Women interrogated.	Live and still births.	Still births.	Still births per 1000 live and still births.
Young's Survey, Pemba	... 1,319	3,412	224	66
Addis' Survey, Pemba	... 3,685	16,679	2,444	146
Three Fishing villages, Zanzibar	... 115	628	224	357
Total	... 5,119	20,719	2,892	140

These figures are truly appalling if they are correct, and I see no reason to doubt their approximate accuracy. In Young's survey, a history of 281

abortions was obtained, which gives an abortion rate of 76 per 1000 of total pregnancies. If this rate is applied to the total figures it would indicate that of every thousand pregnancies occurring, 76 are wasted by abortion, 129 by still birth and 179 by death during the first year of infancy, a total wastage of 384 per thousand pregnancies. At present it is not possible to ascribe this state of affairs to any known cause or causes. Young, during his survey, also found that 260 of the 1,319 women interrogated by him were barren.

Maternal Mortality Rates.—The figures quoted in the return compiled from the Registers are high, but not exceptionally so in the circumstances of this country. There is no supplementary knowledge available regarding this rate.

II. EUROPEAN OFFICIALS.

The officials included in Table A and B below are those whose names appear in the Protectorate Staff List only. Wives and families are not included.

TABLE A.

Table showing the sick, invaliding and death rates of European officials during the last three years :—

	1933.	1934.	1935.
Total number of officials resident	106	105	97
Average number resident	77.63	68.64	69.62
Total number on sick list	298	290	180
Total number of days on sick list	546	585	979
Average daily number on sick list	1.22	1.6	2.68
Percentage of sick to average number resident	1.93	2.33	3.85
Average number of days on sick list for each patient	1.83	2.02	5.43
Average sick time to each resident	7.03	5.57	10.09
Total number invalided	2	—	—
Percentage of invaliding to total residents	1.48	—	—
Total deaths	1	—	—
Percentage of deaths to total residents	.94	—	—
Percentage of deaths to average number residents	1.29	—	—

The most common diseases were :—

Influenza	16
Diseases of the Digestive System	14
Otitis	12
Diseases of the Respiratory System	11
Malaria	7
Debility	7
Local Injuries	6
Hæmorrhoids	4

Medical Boards were held to enquire into the health of two European officials during the year and the following recommendations were made :—

To proceed on home leave for treatment :

Tropical Neurasthenia	1
-----------------------	---

To proceed on local sick leave :

Secondary Anaemia subsequent to Influenza and its complications	1
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Deaths.—Nil.

III. EUROPEAN NON-OFFICIALS.

Two hundred and thirteen European non-officials reported at the Government Hospital as compared with 221 during the previous year.

Principal causes of sickness :—

Malaria	22
Local Injuries	22
Diseases of the Digestive System	17
Debility	8
Influenza	7
Otitis	5
Hæmorrhoids	4
Diseases of the Respiratory System	13

Deaths.—Nil.

IV. NON-EUROPEAN OFFICIALS.

TABLE B.

Table showing the sick, invaliding and death rates of non-European officials during the last three years :—

	1933.	1934.	1935.
Total number of officials resident	... 535	421	496
Average number resident	... 483.94	378.51	446.3
Total number on sick list	... 387	562	306
Total number of days on sick list	... 2,489	2,840	2,281
Average daily number on sick list	... 6.81	7.78	6.25
Percentage of sick to average number resident	... 1.41	2.06	1.4
Average number of days on sick list for each patient	... 6.43	5.05	7.45
Average sick time to each resident	... 5.14	5.31	4.6
Total number invalided	... 4	1	9
Percentage of invaliding to total residents	75	.24	1.82
Total deaths	... 1	3	2
Percentage of deaths to total residents	19	.71	.4
Percentage of deaths to average number residents	21	.79	.45

The most common diseases were :—

Influenza	... 110
Malaria	... 51
Diseases of the Digestive System	... 30
Diseases of the Respiratory System	... 16
Diseases of the Skin	... 14
Diseases of the Circulatory System	... 14
Diseases of the bones or other organs of locomotion	... 13
Local Injuries	... 10
Diseases of the Genito Urinary System	... 9

Medical Boards were held on 9 Asiatic Officials of whom 8 were permanently invalided for the following causes :—

Pulmonary Tuberculosis	... 2
Chronic Malaria	... 1
Senile Debility	... 1
Neurosis	... 1
Chronic Neuritis	... 1
Chronic Gastritis	... 1
Defective vision	... 1

Deaths.—Two deaths occurred during the year

Pulmonary Tuberculosis	... 1
Diabetes	... 1

SECTION III.

HYGIENE AND SANITATION.

A. GENERAL REVIEW OF WORK DONE AND PROGRESS MADE.

I. PREVENTIVE MEASURES.

(a) MOSQUITO OR INSECT-BORNE DISEASES.

Malaria—Malaria presents itself most forcibly as a disease threatening to invade the townships, especially in the period after the rains. Co-existing with this problem is that of preventing malaria in rural districts in some measure. The rural population suffer from the disease, especially in childhood, and serve as a great reservoir of infection,—an army of carriers. Reviewing the three arms of preventive action, namely, treatment of the infected people, avoidance of infection, and destruction of anopheline mosquitoes, we find that we have hardly begun the fight against rural malaria. Treatment is afforded as a stock quinine mixture to out-patient fever cases attending rural dispensaries, and to children at some of the schools. Beyond a radius of a mile, however, even a good dispensary treats only a small number of the population and the treatment that is taken is probably inadequate from a preventive point of view.

At the end of the year consideration was being given to making quinine available to rural populations at cost price through the agency of schools, post office savings bank and chiefs.

The principle of taking steps to avoid infection possibly holds out the best immediate hopes for a sensible reduction of malaria in the country. Health education may be effected—and is even now being effected—in greater or smaller degree by the general spread of modern ideas from the town, by forms of organization and control, and by health work by rural dispensers and officials. Through the first agency may spread the custom of using mosquito nets, the improvement of housing, the advisability of adequate treatment of malaria patients, the public duty of mosquito destruction including even the treatment of pools, streams and swamps. Official organization and control (so little evident as yet in the country districts) will have to step in and help such tendencies and expand them into, perhaps, wise sitings of villages and the systematic treatment of natural waters to render them unsuitable for mosquito breeding. That modern ideas of protection are spreading from town to country is exemplified by the fact that a survey of sixteen native villages containing 4,943 huts, revealed the fact that 304 mosquito nets were in actual use.

Township Malaria.—With the evidence of malaria in the returns of patients from the town hospital, and with the steady catching of adult mosquitoes from the various points in the township and analysis of the catches into *Anopheles*, *Culex*, *Aedes* and other genera, the sanitarian develops a sense of the presence of an anopheline army on the outskirts of the town. This enemy after the rains gathers force and creeps into the town, now here, now there, but particularly by avenues on those sides of the township bordered by streams, ravines with seepages along their banks, creeks passing up into low valleys, rice fields, swamps and water holes.

In the townships of Pemba, with their smaller extent, the anophelines often overrun the town and malaria appears before they can be overcome.

Zanzibar Town is bigger; it is protected on two sides out of three by beaches that afford little landing place to anophelines—though larvæ have been found in basins in the coral rock—and it is divisible into two towns, one being of stone-house town cut off from the country on its third and remaining side by the other which consists of a semicircular belt of native locations. The result is that in Zanzibar a sense of malaria control is felt, for the effectiveness of the anti-anopheline measures that are conducted in the succeeding belts of potential anopheline breeding ground eastwards is gauged through the whole, or part, of the depth of the belt of native quarters, through which the anophelines have

to filter to reach the main town. Occasionally, however, the anophelines circumvent the filter and enter the town along the seashore approaches from the north or south. Records from the six control stations shows that during the past year there was fairly effective prevention of anophelines throughout the township area. Five of these control stations consist each of two native huts situated on the boundaries of the town, and the sixth is two selected houses in the congested area of the stone town. In the first five control stations 32 adult anopheles were found in May, 19 in June, 3 in July and 1 in August. From then to the end of the year none were found. In the sixth control station, none were found throughout the year. Taken in conjunction with the decrease of cases of malaria recorded in the township from 4,473 in 1934 to 2,452 in 1935, these results clearly indicate that control is becoming effective.

The defences against anophelines in Zanzibar consist chiefly of various permanent works and in the maintenance of a small body of labour engaged in oiling with a mixture of crude and paraffin oils and spraying with a mixture of Paris Green and coral limestone dust. This body of labour has had largely to be economized from other branches of work but, as seasonal pressure of work permitted or circumstances demanded, it has been further engaged in cutting new, or clearing or grading old earth drains, clearing bush and levelling up depressions of ground, cleaning out permanent drains, collecting coconuts and sea shells and generally searching out and attending to sources of larvæ.

The Zanzibar Town lines of defence can be described as a series of concentric arcs, the innermost comprising the recreation grounds between the native and stone-house areas. Here land long ago reclaimed from the creek becomes flooded during the heavy rains owing to the inadequacy at such season of the drains which empty by a hand worked tidal gate to the sea.

The arc next further out consists of a wide belt running right through the main native locations and containing a number of quarries and ancient heads of tidal creeks or similar low-level areas of ground. Anopheline breeding grounds are here being most effectively eliminated by the system of controlled dumping. The largest dump is in a quarry into part of which still flows the effluent from the septic tank of the town cattle station. Other dumps have already sufficed to fill up old breeding areas, and at three other points dumping is still in progress. The filling of real tidal areas along the town creek has been suggested, but for the time being non-tidal areas take precedence.

The next arc is a green belt following the semi-circular Lady Janbai Road. Through it run two long lengths of storm water drain, one emptying to the sea northwards, one southwards. Both fill with sand after the rains, but especially the latter down on to the low lying ground of which the loose soil of the native village to its inner side is carried by road culverts. Much labour is expended in clearing the drain of sand after each rain and making use of the sand, as far as time permits, for filling depressions. Gradually the general level of the area will be raised by a process which, however, in the meantime gets continually out of hand as far as available labour is concerned. Across the most swampy part of this land the cattle cross to the Town Dairy Station but it has now been decided that cattle shall be excluded from the Township at a date in the year 1936. The south drain, after receiving some sullage, enters upon a wide area near the sea over part of which the tide now and again comes and surrounds the drain, which is here inadequate to hold its non-saline contents. On the out-skirts of the tidal area is a subsoil drained slope with seepage banked up by tide.

The succeeding arcs of country just within the town boundary, just outside it, and beyond it to points nearly 3 miles out, are the real seats of the warfare by the malaria gang against the anopheline. Running southwards are a succession of valleys to the sea. The third one counting outwards is a ravine with a stream in it that in rainy weather scours deeper and deeper into the ground. In the longest valley of all, which runs a good part of the way round the town, a length of concrete drain starts in the Migombani Government Gardens and passes under the Fumba road to develop into a fairly ambitious scheme of anti-malarial drainage comprising a deep continuous drain, subsoil drains, and surface channel drainage.

Running towards the town and then northwards to the sea are two streams down the middles of valleys. One enters the town through the extensive excavation that was made to obtain spoil for the Harbour Works construction and where dumping is now started and where the ground levels are being gradually improved and football fields made. The other stream has a debouchement through an area in which bush and grass grow readily. In the upper reaches of both streams are swamp areas, rice fields and Indian market gardens with irrigation channels.

Relief is being constantly sought for the permanent labour establishment whether in the form of assistance from permanent drainage, closure of water holes, exclusion of cattle, co-operation of land owners in bush cutting, erection of barriers against sand, or by dumping in hollows, so that the activities of this labour may be employed to give surer protection in the nearer areas, or further extended control in the outer ones.

The anti-malarial problems of the Pemba townships are to some extent similar to those of Zanzibar, but they are more severe. An enormous partly tidal creek valley, with a barely perceptible fall to the sea, stretches an arm round Chake Chake in one direction while a creek and stream with a net work of tributary valleys form another arm stretching round the town in the other direction. In the upper reaches of both valley systems, and even within the township, are many rice fields. The first swamp has a large area of bush in addition to hill sides with seepage and rice fields creeping down yearly nearer and nearer to the sea. In the heart of the township permanent drainage, careful tending of a golf course, levelling work and general close attention to the ground, prevents breeding for any continued period, but further out gum tree planting and extensive earth drainage work fail to afford a similar complete control. Fortunately, the creek bed is rising and good results are being obtained by encouraging natives to plant up the grass covered areas with rice and to maintain their own drainage in these fields. Elsewhere, bamboo lengths laid to form sub-soil drains are giving fair promise of successful drainage.

The following is a table of mosquito control statistics in Chake Chake:—

	Anopheles.	Culex.	Aedes.
Number of larvæ collections discovered	246	336	150
Number of adult mosquitoes collected	656	1,462	445
Number of linear yards of earth drain constructed	12,935		
Average monthly number of linear yards of earth drain cleared and graded	3,002		
Number of square yards of bush cut	276,110		
Number of 3" concrete pipes of sub-soil drainage put in	27		
Number of linear yards of bamboo sub-soil pipes put in	80		
Number of eucalyptus trees still surviving	44		
Number of loads of earth used for filling at Mtenga Swamp corner only	923		

Mkoani Township, similarly, has creek valleys on two sides of the town. Bush cutting, earth draining and eucalyptus trees supplement the service of a certain amount of permanent surface and sub-soil drainage. The oldest of the eucalyptus trees planted for anti-malarial purposes are in this station and seventy-three of them are now well established there.

Wete is now relatively well provided with permanent drainage, but an unfortunate feature of agricultural drains seems to be that after a number of years they cease to function satisfactorily and Wete is now reaching that stage after enjoying for a year or two freshly installed drains. In none of the stations can there be said to be any possibility of reduction in the anti-malarial permanent labour establishment.

A puzzling problem in each of the Pemba Townships, and to a less extent in Zanzibar, is the relationship of storm water to the malaria swamps and valleys and to their drainage systems. Storm water in the heavy rains descends down the valleys with considerable force and scours seriously. The advisability of earth drain construction, wide and shallow, contour or herring bone or main channel in nature, is often in question. If the drain takes much water, it gets out of hand through deep and irregular scouring. If it drains away a little water satisfactorily in the wet weather, it may expose what would be sub-soil water in the dry, and the last condition, unobserved, be worse than the first.

Filariasis.—A further problem is that not only is storm water frequently deflected into the valleys about townships but that sullage is also. The tendency in the past has been to call for more and more sullage pits. It is open to question whether the anophelne-malaria problem has been lessened, and whether the culex-filaria one has not been increased, by this course. Sullage water thrown about the ground, or running out on to it from a hole in a hut wall or a courtyard fence, offends the eye and nose, and in its train follows fly breeding, but the multiplying of sullage pits and cesspits seems also to bring troubles in its train. In some places the profusion of sullage pits seems to lead to a saturation of the ground, at least during the wet seasons, so that in each hole the water table is evident, and in many the intake becomes faster than the soak-away and oft repeated overflows take place. Emptying in itself is frequently an offensive procedure and the reluctance to clean the pit and break the sealing of its sides means a chronically troublesome pit. If the pit is on a hill and is functioning, seepage is often met with at an awkward place at the foot of the slope. If the pit is on flat ground, it will contain water or at least it may contain water. The latrine or cesspit, often used on native premises for ablution waste also, may have too to be classed with the sullage pit in these respects.

An interesting comparison can be made between the adult mosquito catches and the larval finds of anopheles, culex and ædes in our townships:—

ADULT MOSQUITO CATCHES.

		Anopheline.	Culex.	Ædes.
Zanzibar	...	55	589	54
Chake Chake	...	656	1,462	445

LARVAL MOSQUITO FINDS.

		Anopheline.	Culex.	Ædes.
Zanzibar	...	107*	382	2,637
Chake Chake	...	246	336	150
Mkoani	...	22	47	7
Wete	...	89	133	207

*Almost all from beyond the town boundaries.

The common adult mosquito in the townships is culex. The public takes its measure of mosquito control from the prevalence of this annoying genus. The reality of the danger from it is, moreover, demonstrated by the prevalence of filariasis. An astonishingly small number of larval finds in proportion to the infestation is found. In marked contrast ædes is found mostly in the larval form. It is thought that the unseen culex larva is in the sullage and cesspits, for from them adult culex may often be caused to rise by the dropping of a stone down the hole. Sullage pits are all recorded and are regularly oiled by a small staff, except in those cases in which—and in Zanzibar much progress has been effected in this direction—all mosquito access to the pit is effectively sealed by a trapped gully and a tight fitting manhole cover well silted round. The cesspit, which is so often, too, a sort of sullage pit, is, however, under less definite control than the frank sullage pit. Its numbers in the native locations are often great, and it is usually to be found inside the hut itself where it often shares the rear third of the dwelling with the kitchen, from which it is, or is not, separated by a low wall and a hanging sack doorway.

At times like the clove picking season a large proportion of native huts may be found shut up. Particularly is this the case in Chake Chake with resulting anxiety to the Health Authorities. It is never certain when a pit is being a mosquito nuisance; reliance in fact is placed on the intimate acquaintance with the houses and the pits in them that is possessed by the sanitary inspector of the district and his assistants, the mosquito searchers. These men do become fairly shrewd in judging where the responsibility for an increased output of culex adults may be found, and, provided the trouble is not too widespread as when the water table is high, oiling of pits can be fairly economically conducted by judicious selection with attainment of appreciable improvement. The extent of the cesspit problem may be gauged from the following figures supplied for

one out of the four or so native villages that with a business area comprise the township of Chake Chake.

Native Huts.	Cess-pits.		Total.	Sullage pits.	Surface drains.
	Inside the hut.	Outside the hut.			
155	99	2	101	11	2

In Wete 10,937 sullage pit and 9,185 cesspit inspections were made, many of these followed by oiling of the pit.

Dengue and Yellow Fever.—Adult *ædes* mosquitoes are seldom seen in the stone built area of Zanzibar Town. On almost any native premises, a day or two before the weekly house to house inspection of the area by the mosquito searcher, *ædes* larvæ can be found. They will probably be in one of the water jars on the kitchen floor, though many natives have now learnt to cover the jar with a plate or other cover. Even more probable is a find in the tin or earthenware jar of water in the “choo”, the bathroom-latrine. If the larvæ are not found there, they will be found, especially during the rainy season, in the courtyard at the back of the house, in a vessel, or bottle, or bit of guttering or in a tin collecting rain water. It is not unusual to see a dozen or a score of water containing vessels in a compound and to find two or three of these containing larvæ. As a mosquito searcher may have two or three hundred premises to inspect in his day’s round and as entry cannot be gained to a hut and a reasonable search made in much under five or ten minutes, it is natural to seek some alternative to increase of staff for effecting control of *culex* and *ædes*. The obvious alternative seems to be a system of water carriage to the huts and suitable drainage from them. High pressure water supply is being extended to serve wider areas, and more and more stone houses are being caused to substitute for their sullage pits connecting drains to public drains and for their cesspits water-closets discharging through septic tanks to public drains. House water supply is not in sight, however, for native locations, but the readier to hand the public stand pipe, the less the need for water storage in huts should be. A further good result of water pipe extension may be the closure of wells and water holes.

Other forms of mosquito preventive work comprise collection, or otherwise dealing with, coconuts, shells and tins, filling or oiling of crab holes, inspection of canoes and dhows, maintenance of mosquito proofing of tanks, and attention to gutters, inspection of trees, and supplying of fish in certain cases for ponds.

The intention of the last is often defeated by the children catching the fish and eating them as whitebait.

(b) EPIDEMIC DISEASES.

In the British Medical Journal of January 18th, 1936, F. M. Burnet describes the most characteristic development of epidemiology since the War as “the adoption of a more œcological view, in which the activities of the two organisms concerned—man and the pathogenic micro-organism—are both considered from the point of view of survival of their species”. He proceeds: “Specific disease is coming to be regarded as an exceptional incident rather than the normal result of effective contact between host species and pathogenic micro-organism. Both in Bacterial and in Virus diseases there has been an increasing recognition of the frequency with which extremely mild grades of infection occur, producing few or no symptoms but allowing the development of an immunity against exposure to a heavily infected environment”.

The flexibility which thus becomes demanded in the principles of control of epidemic disease is exemplified in Zanzibar by the increasing recognition of the function of the laboratory in

- (a) the recognition of diseases, especially in mild or a typical, endemic or sporadic or animal reservoir, from which epidemics may arise, and
- (b) the measuring among the people of immunity towards the various epidemic diseases to which circumstances may subject the Protectorate, and
- (c) co-operation in the artificial altering of immunity wherever possible.

A large field lies open; a goodly area, but relatively to the whole a small one, is being covered. Sera from Zanzibar natives sent for mouse protection tests have shown no evidence of recent mild yellow fever in the Protectorate but, equally, are they evidence of our complete susceptibility should air communications introduce the infection into these islands. The existence of any forms of *Brucella* or *Rickettsia* infection awaits determination. A European Brucellosis case did occur in 1930. Anterior poliomyelitis has not appeared during the year on any treatment returns. Cerebro-spinal meningitis is curiously absent, as, according to treatment returns again, dermal leishmaniasis, lymphogranuloma inguinale and pellagra are, also. Material for a more definite estimation of the position occupied by syphilitic infection is being passed through the Laboratory.

Much has been learnt during the year concerning the relationship of cases to cases, and cases to carriers, by sera examinations and by culture and typing of organisms in connexion with the diphtheria, the dysentery, and the enteric fever and "food poisoning", groups of communicable disease. The role of the local laboratory in increasing immunity in a small or greater portion of the community in relation to whooping cough, tuberculosis and small-pox depends on many factors.

With these remarks to indicate that a certain aspect of preventive measures may be looked for within the Pathologist's report, it is possible to confine the present section more narrowly to the sanitation measures directed against the elements of the various communicable diseases.

Plague and cholera are the outstanding major infectious diseases that have been absent from Zanzibar for many years. Smaller ships now come alongside the wharf at Zanzibar. In the dhow anchorage dhows from India, Arabia and Somaliland lie up on the beach. There is never much evidence of rat guards. Rats abound on the sea beach under the sea wall. As the tide rises, they may be seen disappearing up the drains that discharge through this wall. Rats, indeed, afford additional argument on behalf of the principle of extending provision of proper water-seals through the drainage system of the town.

Under the circumstances it is surprising that rat numbers are so well controlled. Hitherto the Health Authorities have shouldered the task of destruction of the pest throughout the town both on Government and private premises. Calls are now many, however, on a limited staff and the more logical attitude is taken that the primary health duties are the watch on the rat population, the continuous examination of a large number of rats from various parts of the town, and the initiation or encouragement of due measures by individuals to keep their premises free of rats. To this last end rules for rat proofing of godowns find a place in new draft building regulations and zoning the town for building is also under consideration. Destruction of rats, apart from numbers killed by the Public Works Department by fumigation, has reached the following numbers in the various districts during the year:—

Zanzibar Town.	Chake.	Wete.	Mkoani.
10,779	4,094	2,880	3,014

Rat slides were examined at the rate of rather more than two a day.

The rat population does not seem to be large in the rural districts as the following tables show:

	Number of huts inspected.	Number of huts in which rates were seen or reported to exist.
Pitanazako and Potowa	624	3 (in roof in each case)
Pitanazako and Chutama	993	10 (nearly all in small shops)
Moga	1,271	13 (7 in huts and 3 in Manga owned shops)

Small-pox.—Vaccination has been carried out fairly steadily throughout the year both in Zanzibar and Pemba. Through the Town of Zanzibar a small vaccinating staff has been progressing systematically by house to house visiting. In the villages rural dispensers and sanitary staff have done a certain amount of vaccinating. The law lays the responsibility for bringing children for vaccination upon their guardinas, but in practice the vaccinator has to supervise

the home in this respect. In Pemba villages the proportion of the population found vaccinated varies from about 50% to about 75% of all the people. The following table shows the progress of vaccination during the year 1935 :—

Zanzibar Town.	Steamers.	Dhows.	District.	Wete.	Chake.	Mkoani.
7,976	1,016	786	999	634	381	128
10,777 in Zanzibar Island.				1,143 in Pemba Island.		
Total				11,920		

In addition to the Port Medical Officer's examinations of vessels entering Zanzibar, inspection of all passengers arriving in Pemba ports on dhows and steamers *via* Zanzibar is carried out by the local health authorities.

Chicken-pox.—In the majority of cases of chicken-pox occurring in Zanzibar isolation at the Infectious Diseases Hospital was practised, contacts likely to be susceptible being also isolated but in a separate building.

Due exclusion from school was arranged for and any isolation practised in the home was confirmed as far as possible by visits of inspectors. Nevertheless, movements of cases between town and country occurred.

Measles.—Most of these cases occurred in Pemba in the neighbourhood of the small Township of Kengeja where a rural dispenser and the village school-master did what they could to control contacts.

Whooping Cough.—The late notification of cases of this disease made control difficult. In each case of notification the home of the patient was visited and a report made upon it, and upon the contacts and their homes too.

Diphtheria.—See Pathologist's report.

Puerperal Fever.—Midwives attending cases notified as puerperal fever were interviewed. It is apparent from these interviews that there is common among many Indian communities a custom of employing what may be termed uncertificated hereditary midwives, a proper midwife being merely engaged to come in at the last moment or if difficulty arises.

Dysentery.—Careful watch in institutions such as prisons and hospitals is found to be most necessary in this country in respect of :—

- (a) Dysentery carriers,
- (b) Protection of food,
- (c) Functioning of water-closets or other means of excretal disposal and
- (d) Fly infestation.

That sanitary inspection is still necessary after the fitting of modern conveniences has been proved.

Much effort has been directed towards getting sellers of any form of cooked food to protect food exposed for sale. Rules under the Public Health Decree cover hawking of food fairly satisfactorily, but exposure of bread by shops that are not restaurants nor bakehouses nor hawkers, has been difficult to deal with in the absence of strong legal sanction for demanding covering of food in these particular cases.

The Enteric Fever and "Food Poisoning" group has been evident as a "street" disease. The Pathologist gives an account of investigations. From the sanitary point of view it is evident that the more effective separation of excreta from food by the covering of food exposed for sale and by replacing inadequate and defective pit-latrines in stone houses with a water flush system through septic-tanks to town drains, has to be accelerated to the utmost. Co-operation between water and drainage authorities and the house owners should sensibly reduce the typhoid danger. Treatment of the carrier may be valuable but it again demands a full measure of co-operation.

The ineffectiveness of the control of township milk as to cleanliness and safety will be brought more definitely under discussion with the removal in 1936 of the Zanzibar Town cow sheds and milk station to a new site outside the Town. At present roughly one-third of Zanzibar Town milk comes from this source and the remaining two-thirds is brought into town in cans by a hundred or so

vendors who come in night and morning on bicycles. Of Zanzibar Town's milk perhaps three or four hundred gallons from town and country sources pass in a morning before the inspector in the market. It then goes forth to sale by purveyors. Nearly as much milk reaches selling dairies or consumers direct and does not go before the inspector. No can cleansing facilities and no milk pasteurizing apparatus exist. All purveyors, however, have to undergo medical inspection and cans and dairies have also to receive the sanction of the sanitary authorities.

Tuberculosis.—The home conditions of notified cases of tuberculosis are investigated. All contacts are advised to put themselves in the hands of their medical practitioner or to come up to the Wednesday morning Tuberculosis Clinic. Many patients in Zanzibar are persuaded to go to the tuberculosis wards attached to the Walezo Infirmary. Particularly is effort to this end made in the case of those living among children or in poor or in overcrowded conditions, or who are jobless, or who are deprived of their means of livelihood because as milk or food purveyors they may be sources of danger to the public. Advice is tendered at the home by the sanitary inspector as to the methods of limiting the dangers of infection, and a sanitary survey of the house is made. Unfortunately the amount of bad housing and overcrowding is great and has to be methodically treated from other angles as circumstances make possible. The system of filing of sanitary details, however, based as it is on separate house premises and area files, brings out clearly the association of infectious disease with any house as the years go by. Infectious Disease, indeed, is observed together with items in the sanitary history of the premises and parallel with the history of the structural alterations recorded in the House Building File. The necessity for provisions to insure a clean milk supply in Zanzibar is much under discussion. It cannot be said that tuberculosis has been traced to milk, in the town; bone and intestinal cases of the disease are few.

Leprosy.—Leprosy can be sought for; it can also be rather reluctantly admitted. A man is alleged to be a leper by a friend; in consequence he appears before the district medical officer who enters his name in his Reputed Leper File, examines him and classifies him as an Unconfirmed, a Suspected, an Observed (a definite leper not to be segregated in asylum at the moment) or a Segregated Leper (to be sent to Asylum) and the name is transferred to the appropriate class index in the district files, and the schedules of examinations are filed. If the leper goes to asylum, he will be for the time being out of the district medical officer's hands. If he is not sent to the asylum, he will return to his home somewhere in the district and join the numbers of suspected, observed and paroled (from asylum) lepers whom the district medical officer has under supervision in his district.

If the district medical officer seeks for the man's family connexions, other cases of leprosy often come to light. If the leper is thereafter occasionally looked up in his home, he appreciates the care and also responds further by reporting himself periodically and with fair regularity to hospital for some sort of treatment and by way of greeting. If, however, his name on first examination is merely recorded, he soon becomes lost until someone again alleges his leprosy. It is not unusual this next time for a leper of a very much more obvious type of disease to appear. His history in the meantime is one for conjecture.

Both as regards isolation of cases and reception of cases on parole, lack of standard in working can undermine the principle, still so valuable, of keeping and treating apart any disease in its infectious stage.

Reports on the Leper Asylum on Funzi Island and the Leper Settlement attached to the Walezo Infirmary are given in Section VII of the Report.

Venereal Disease.—No preventive action can be said to be taken in Zanzibar but treatment is available at hospitals and dispensaries. Much of the native population of Zanzibar Town consists of bachelor mainland natives. Probably on this account, brothels—unrecognized—and houses of assignation, reach enormous numbers. In the stone built town they number perhaps four hundred. In the native town, the term becomes vague and indefinite. To say there are

nearly a thousand brothels would be hardly fair to the town: a sort of polyandrous custom is widely practised.

(c) HELMINTHIC DISEASES.

Prevention of helminthic disease in Zanzibar means prevention of ancylostomiasis, ascariasis and schistosomiasis: the stopping of defæcation on the soil surface, of drawing of water from unprotected water holes, and of passage of urine into bathing streams. Next to nothing has been accomplished as regards the last two measures and little as regards the first. All three are matters of rural sanitation and the sanitarian's energies are apt to be absorbed by the township.

Food shortage was undoubted among the natives of Pemba in 1933 (2 years ago) when the weather was dry and money was scarce. An ulcer epidemic was then experienced. In the light of the recent Rockefeller Institution demonstrations of the lowered resistance to helminths that follows poor diet and Vitamin—A deficiency, we may not be wrong in imagining that a slight set back has been received, here, in the helminthic field as a result of the hard times in 1933, and that one factor for recovery now must be economic betterment and some re-adjustment of the native dietary.

Ancylostomiasis.—Ancylostomiasis is proportionately less heavy among the town native people, among whom pit-latrines are in almost universal use, than it is among the natives of the agricultural districts where pit-latrines are few. Nevertheless, the towns do send many natives, though no Indians, suffering from ancylostomiasis to hospital. Infection has presumably been received on short or long visits to the country, but its occurrence in this way raises the question whether the cheap Japanese shoe might accomplish for ancylostomiasis what the cheap Japanese mosquito net might accomplish for malaria, reduction in incidence spreading out from the towns throughout the rural areas.

The alternative solution of the ancylostomiasis problem lies in a satisfactory system of excretal disposal. The African method, when surface defæcation is abandoned, is to use a hole in the ground, usually inside the hut for the sake of privacy. Hygienic progress, therefore, will naturally take the line of extending the use of pit-latrines countrywards and in trying to get the type and siting of them improved from every hygienic standpoint. Extension through the country is partly a matter for propaganda and partly for demonstration of a cheap and feasible type of construction. Propaganda is being carried out by rural dispensers in the course of their village visiting and also in the course of the rural sanitary surveying that is being done as far as staff will permit of that activity.

An Iwan Auger Bottom from the Oil Well Engineering Company of New York has been provided with superstructure made by the local Public Works Department and has now been tried out in a number of places. It bores a hole 18 feet deep by 18 inches diameter, but will not cut the coral limestone rock frequently encountered. Water is generally met at the lower depths of boring. To prevent falling in of the sides towards the top, and scour of the edges, a colas drum can be inserted into the hole flush with the ground. A one inch thick concrete slab of 30" diameter, with a latrine-hole in the centre and a slightly cupped upper surface, has been designed to fit by a groove on its under surface on to the upper brim of the colas drum.

It is hoped, by progressive increase of employment of such construction at a small charge to the individual, that a suitable latrine may set the fashion better than did the more ambitious cement-floored bathroom-latrines built some years ago as models at various points through both islands.

Ascariasis and Schistosomiasis.—The usual native source of water in the district is a hole or pit in a valley or at the side of a stream. It is not unusual to see a water jar being filled on one side of a narrow stream,—at a hole partly filled by water seeping through the mud and partly by overflow from the stream, —and a person bathing on the other side of the stream. There is seldom any attempt to protect water holes from inflow of surface water.

In the promotion of good well construction and of protection of streams from pollution by urine all that is being done at present is the missionary work by the rural dispensers, whose gifts of personality vary greatly.

These seems no reason why the latrine-borer should not also be used for making shallow rural wells, and the colas drum raised above ground level be a first step in some form of protection. Already one hole bored for a man's latrine has been found used as a well instead.

The question of the advisability of some form of examination and treatment for all native children transferred from Pemba to Zanzibar has arisen in view of the much greater prevalence of schistosomiasis in the smaller island. The carrier snail, *Isidora ovidia*, is widely distributed in both islands.

II. GENERAL MEASURES OF SANITATION.

(a) SEWAGE DISPOSAL.

General—Disposal of human excreta—and also sullage, waste and storm waters—takes place in three ways in the Protectorate: discharge upon the ground surface, conduction into pits, removal by sewers to pits or sea. The three methods can be identified fairly closely with the countryside, the native quarters of towns, and the stone-house part of Zanzibar Town. Efforts at improvement can be described as directed to shifting the main weight of type of method used, more and more, from surface disposal to pit disposal and from pit disposal to sewerage.

Rural.—In the countryside, therefore, the rural dispensers and, where it has been possible to start sanitary surveying, the sanitary surveyors, preach the value of household pit-latrines. Experiments with a latrine borer now raise hope of affording help, as far as staff and borer prove ultimately available, in the provision of good pit-latrines for native quarters. By arrangement with applicants, and in return probably for a small payment, it is intended to undertake the boring of a hole and the fitting of it for a householder or prospective builder with a saucer like concrete slab flush with the ground such as will rest on a colas drum let into the upper three feet of the hole. Already purchase of covers has started among the people.

That the advance is likely to be along the easy lines of a natural tendency may be shown by the following table of figures of pit-latrines, with the proportions in which these may be found in the huts of native locations from various places from the towns to the remoter country districts.

LOCALITY				Number of Native type huts	Number of pit-latrines			Number of huts without latrines	Percent- age of huts provided with pit latrine
Name		Nature			Inside hut	Outside hut	Total		
Potowa	...	Remote rural	...	366	...	...	...	366	0%
Mwanda	...	"	...	339	...	18	18	321	5.3%
Pitanazako	...	"	...	719	...	47	47	672	6.5%
Chutania	...	Less remote	...	532	...	68	68	464	12.8%
Moga	...	"	...	301	...	44	44	257	14.6%
Donge	...	On a main Road	...	1,379	20	215	235	1,144	17.0%
Kichungwani	...	Native quarter of Chake Town		155	99	2	101	54	65.0%
F. District	...	Native quarter of Z'bar Town		1,817	759	558	1,317	500	78.0%
E. District	...	"	...	2,821	2,116	518	2,634	187	93.4%
D. District	...	Partly native and partly bazaar		2,026	1,715	212	1,927	99	95.1%
C. District	...	Native, Arab and Indian	...	224	164	41	205	19	91.5%
B. District	...	Bazaar	...	61	64	...	64	...	100.0%
A. District	...	Business and residential	...	24	19	6	25	...	100.0%

The disposal of sullage, bath, waste and storm waters in the rural districts cannot yet be practically considered.

Native Quarters of Towns.—The provision of pit-latrines in the native quarters of the township is complicated by the lack of room and order in the present maze of huts. As will be seen from the tables, in contrast to those of the country, the huts of the towns have their pit-latrines for the most part inside the huts. The kitchen and latrine-bathroom are frequently in continuity or separated only by a low wall and constitute the rear third of the hut itself. Where, in the attempt to obtain model standard lay-outs, authorities have succeeded in getting separate latrine-bathrooms and kitchens built in the rear corners of the plots, it has frequently happened that such out-buildings have been completed over-large and used as separate dwelling huts. Thus the whole problem of decent latrine provision in the town native locations is bound up with that of housing and town-planning.

In these town native locations sanitation difficulties are created, too, by such processes as discharge of sullage water through the walls of huts or compounds on to the ground with consequent fly and mosquito dangers, scouring by storm water round native huts making of the sanitary lanes in some places ravines, water-logging of pits by surface water or sub-soil water.

Business Areas of Smaller Townships.—The business or stone-house quarters of the smaller townships show a transition type between the Zanzibar Town native quarters and the stone-house area of that town in the matter of sewage disposal and drainage. Very few public drains, apart from anti-malarial drainage, exist in them. Such lengths of drains as do exist are either surface drains or are at least freely open to the surface and take away storm water, or water from standpipes. The houses in these towns are thus dependent on a multitude of cesspits and sullage pits. Some of the cesspits do not even merit the term pit, being in fact walled-off rooms or cellars of houses. The absence of offence from these places is often quite remarkable. The sullage pits are, however, a constant source of irritation to both authorities and public. They require oiling to keep down culex breeding and they are in many cases in everlasting need of being emptied again.

In Mkoani Township in Pemba, the hospital bucket system of night soil collection has been replaced during the year by pit-latrines. No proper drainage system has yet been obtained for the township market.

In Wete Township 4,899 buckets of night soil were dealt with by prisoner labour during the year, the bucket system being still in use on several government premises in that station.

Zanzibar Town Business Area.—The last picture of the sewage problem is given by the stone houses of Zanzibar. The following table may serve to illustrate the stage reached in this town in the change over to a water-borne sewage system to the sea.

District letter	Nature of district of Zanzibar Town	Number of building-blocks						Total number of pit-latrine	Total number of water-closets	Number of water-closets		
		Number of stone houses	Without latrines of any sort	With water-closet on each floor	With latrine on each floor	With separate soil pipe for each floor	With separate pit for each floor			Through septic tank to cesspit	Through septic tank to sea or creek	Through septic tank to sewer
A	Business	586	4	40	216	76	56	1,032	245	2	14	43
B	Bazaar	1,043	95	28	436	182	56	1,054	121	5	2	13
C	Mixed	546	58	10	261	60	9	807	79*	...	...	8
D	Mixed	450	2	...	224	39	8	687	...	...	...	...
E	Native	29	...	...	7	2	9	155	...	...	...	...
Gaol	...	...	...	...	...	...	...	134	33	...	...	33
F	Native	6	...	...	...	...	...	6	1	...	...	...
Police Lines	...	...	...	...	...	...	...	11	2	...	...	...
Infectious Diseases Hospital	...	...	...	...	...	...	...	1	...	...	...	...

*61 direct to sea.

Very comprehensive provision is made in law for insistence by the Authorities on the construction of drains, and on the connexion of drains to public sewers where sewers exist. A large part of the Zanzibar stone-house town is, however, unserved by sewers, and the extension of the existing system is rendered difficult because the levels were not foreseen with a view to providing for certain low-lying streets. Further, the public drainage system is not entirely closed so that, apart from the lack of check to rats and cockroaches that water seals afford, there is an inability to deal satisfactorily with any raw sewage.

Sewage is not now allowed to pass directly into the public drains, but suitable septic-tank effluent is accepted. The sewers are indeed in the majority of cases combined-purposes drains, unsealed off from the streets. Storm water either runs off down the road surfaces which often have a reversed camber for the purpose, or disappears at intervals down into the sewers through big gratings. Sullage and bath waters are fairly universally trapped by water seals between house and sullage pit or between house and drain. The streets, however, are subject to return of effluvium from the creek through the open grids over the sewers. The septic-tank thus becomes indispensable in the sewage disposal system. In a number of instances its absence is advertised very clearly to the eye at low tide, particularly in the case of certain public latrines with short lengths of drain to the creek. The creek, indeed, accepting, as it does, drains of many sorts, some carried well out and some not, gives forth a most penetratingly offensive smell at low tide.

Chake Chake Town suffers similarly from an offensive creek but here a large amount of defæcation occurs directly on to the bed and sides of the creek.

Public Latrines.—Extended provision of public and communal latrines continues to be pressed for, and pressure is also being exercised on employers of labour to make provision for their men. The term “communal” is used to distinguish those cases in which the call for the latrines comes essentially from a congested area where sufficient private latrines cannot be obtained for the householders, the term public latrine in the more strict sense being retained for latrines built to meet the call of people away from their homes.

(b) REFUSE DISPOSAL AND SCAVENGING.

Both the duty of street cleaning and that of removal and disposal of refuse are carried out by the Health Authorities in the Zanzibar and Pemba Townships. At present the latter duty includes the removal and disposal of trade refuse, free of charge, although it is estimated that in the Zanzibar Township alone somewhere about four hundred of the 40,000 tons of yearly refuse is of trade origin.

Street Cleaning.—The streets in the township vary in type from first class metalled and water-proofed roads through paved alleys to sandy paths between huts. Variety of method in cleaning is thus demanded. In the main streets of the Chake Chake Township in Pemba, especially, sewing machinists, who sit on narrow verandahs in front of the bazaar shops, drop their cloth cuttings into the street all day long. In both Zanzibar and Pemba, even street sweeping twice a day does not, indeed, suffice every where to keep up a high standard of tidiness. In the sandy lanes in the native quarters of the townships cleaning is effected by raking and staff is insufficient to provide more than a maximum of one cleaning daily.

The practice of depositing old motor car bodies, scrap iron, empty boxes, and other obstructive material, interferes considerably with scavenging. These articles have to be removed and disposed of unless they are claimed by their owners within seven days of collection.

Nuisance from promiscuous droppings by donkeys and oxen, not only in the streets but also as a result of parking in odd pieces of land and under trees, has led both in Zanzibar and Chake Chake to movements to obtain sheltered and properly water-proofed and graded stands. Stray animals are impounded as far as possible by the Police. Destruction of pariah dogs, and of prowling cats, too, of which large numbers in a mangy condition exist in many native quarters, is not a duty now assumed by the sanitary authorities, though some measure of co-operation with other departments in this work has continued during the year.

Refuse Removal.—Removal of refuse likewise has to be adjusted in method to the nature of the quarter of the town being served. The Medical Officer of Health for Chake Chake Town in Pemba comments on the impossibility of taking a sanitary cart more than twenty yards into one of the native quarters of that town, with the result that refuse has to be collected and carried out to the carts in baskets. This difficulty arises from the lack of proper sanitary lanes and deep ravine-like scouring by storm water of such spaces as do exist between huts. In Wete a strain upon refuse collecting resources is felt in consequence of a steadily mounting number of cart loads of refuse for collection.

Experiments have been carried out during the year in Zanzibar Town, and are still being pursued, with a view to determining how far a system of containers carried by pneumatic tyred hand-propelled floats can be substituted for the present hand-pulled wooden carts. Innovations, however, require introducing with caution into Zanzibar, for many considerations underlie the methods already in vogue.

During the month of *Ramathan* the amount of refuse in all the townships increases to nearly double its normal quantity and a strain is thrown on scavenging resources. In the past year the holy month fell in December and so was followed immediately by Christmas.

With refuse removal may be classed the duties of clearing ruinous sites and removing debris. Resources for this work are limited.

Disposal of Refuse.—In Zanzibar Town, although a large Horsfall Destructor has been in existence in the town for many years, practically all refuse is dealt with by controlled dumping. The nuisance caused by smoke and dust from the incinerator has thus been reduced to a minimum. The dumps are amazingly inoffensive and the smaller ones, which have been employed to raise the level of land depressions in the native quarters that were formerly water-logged during the rains with resulting mosquito troubles and damage to property, have been extended in each case right up to house walls at the special requests of local residents.

During the year visits by sanitarians from other countries to these dumps have been quite numerous and the general view has been expressed that the method of dumping employed is proving eminently satisfactory.

Proposals have been formulated for reclaiming tidal creek areas by this dumping, cover for the rubbish being obtained from the creek bed in front of the dump. Such dumping in contact with sea action will, however, have to be regarded at first as experimental.

Some trouble has been experienced as a consequence of the habit that has sprung up of driving cattle over these dumps in the evenings. The dump face is pulled down by the search of the animals for vegetable matter in the refuse. In the rainy season further damage is done by the trampling on the upper covering of the dumps. The hoof depressions that result facilitate mosquito breeding—otherwise eliminated by the dump—and also rupture the seal of the dump.

In the Pemba Townships controlled dumping is used in conjunction with the incineration of animal matter at small Horsfall incinerators or at incinerators built with old iron rails. On the out-skirts of the small Mkoani Township is a new native quarter and here the Medical Officer of Health reports that the refuse is now, in part, being trenched. In Wete the incinerator is reported as unable to cope with all the refuse that it is desired to incinerate, with resulting difficulties in preventing fly-breeding.

Rural Refuse.—Rural refuse is dealt with by throwing it round trees to rot and form manure. Whether any form of district organization will ever be able to combine disposal of both refuse and excreta into some form of compost making, especially in these districts where the pit-latrine has not become fashionable, is a question worth bearing in mind. At present, rural dispensers on their visits to villages advise burning the refuse or burying it for the period of rotting. They also advise clearing the village surroundings, for a fair radius, of bush and grass and thus as a corollary of rubbish, too.

III. SCHOOL HYGIENE.

The Euan Smith Madressa, the Aga Khan School and the Government Schools in Zanzibar Town and Rural Districts have been visited by the District Medical Officer, Zanzibar and the pupils of the Government Schools in Pemba have been examined by the Medical Officers of Chake Chake, Mkoani and Wete.

The total number of pupils examined was 1,547 distributed as shown in the Table :—

TABLE I.

ZANZIBAR.		Africans.	Arabs.	Indians.	Others.*
Government Central School	...	107	277	10	95
Euan Smith Madressa	...	—	—	166	—
Aga Khan Boys	...	—	—	338	—
Mwera	...	41	20	—	3
Mkwajuni	...	38	8	—	—
Chwaka	...	30	—	—	—
PEMBA.					
Chake Chake	...	73	47	2	7
Kiwani	...	34	1	—	—
Kengeja	...	17	29	—	—
Jambangome	...	11	7	1	1
Matangatwani	...	24	16	—	—
Uondwe	...	21	6	—	—
Kangani	...	53	5	3	—
Ngwachani	...	34	—	—	—
Ziwani	...	7	4	1	—
Totals		490	420	521	106

*Including Comorians, Persians, Baluchis, etc.

In addition 19 girls were examined at Chake Chake but do not appear in the following Tables, the number being too scanty for analysis. It is expected, however, that in the near future the School Medical Service will extend its surveillance to all Girls' Schools, so that full knowledge of the school-going population will be obtained.

The following reports cover :—

- A. The Zanzibar Schools.
- B. The Pemba Schools.
- C. The Dental Condition of School Children.

A. ZANZIBAR SCHOOLS.

Table II summarizes as percentages by Races the conditions found.

TABLE II.

		AFRICANS.		ARABS.		INDIANS.	OTHERS.
		Town.	Rural.	Town.	Rural.	Town only.	(Comorians, Baluchis, Persians, etc.) Town only.
Nutrition :							
Good	...	76.6	34.9	77.3	42.9	56.1	82.2
Fair	...	20.6	61.5	20.9	53.6	32.9	15.7
Poor	...	2.8	3.6	1.8	3.5	11.0	2.1
Cleanliness :							
Good	...	87.0	46.8	91.4	35.8	72.0	93.7
Fair	...	11.2	49.6	8.6	60.7	18.8	5.3
Defective	...	1.8	3.6	Nil	3.5	9.1	1.0
Vaccinated	...	95.3	45.8	94.9	64.2	93.9	96.8
Nose and Throat	...	5.4	1.8	8.6	3.5	18.4	5.2
External Eye	...	—	0.9	1.1	—	3.1	—
Defective Vision	...	1.8	—	1.8	10.3	9.5	1.1
Ears	...	0.9	1.8	0.7	—	1.5	—
Hearing	...	—	—	—	—	—	—
Defective Speech	...	—	—	1.08	—	0.4	—
Sub-Normal Mentality	...	—	—	0.7	3.5	1.9	—
Heart, etc	...	5.4	2.7	3.2	10.5	1.9	—
Lungs	...	0.9	—	1.8	3.5	4.8	2.1
Enlarged Spleen	...	19.6	73.3	30.3	78.5	10.5	32.6
Other Defects	...	7.4	3.6	6.2	10.3	12.0	7.3
BLOOD: M.P.	...	18.6	—	21.6	—	—	16.8
URINE: Bilharzia	...	—	13.7	—	3.5	—	—
STOOLS: Hookwork	...	—	97.2	—	89.2	—	—

Nutrition.—The outstanding feature is the inferiority of rural children in respect of nutrition. In striking contrast with pupils of the same races in the town, only 34.9% of Africans and 42.9% of Arabs can be described as well-nourished. Although parental ignorance and negligence may account for some part of this difference, it is to be feared that the greater share in it must be attributed to poverty and, since educational expenditure on underfed children is largely wasted, the question of public assistance to bring their nourishment up to a satisfactory standard, as has been found necessary in other countries, is one that demands investigation.

Excluding the rural pupils mentioned, Indian children usually occupy the lowest place in nutritional surveys of the schools and, although reference to tables prepared several years ago points to some improvement, it is difficult to see how this relative position can be altered so long as very many of the children are precluded from nearly all the valuable proteins and fat of animal origin. Milk, which is permissible, could take the place of the missing elements, and it is to be hoped that a campaign will be set on foot to persuade parents that in this food they have the means of establishing the frail physique of their children on a more robust foundation.

The comparative growth and development of the children, although dependent on other factors, such as racial type, intrinsic potentiality of the individual, hereditary tendency, etc., as well as on nutrition, is nevertheless a useful index of the latter. Hence the following table showing the heights (in inches) and the weights (in pounds) of the three numerically predominant races by age-groups will be of interest.

TABLE III.
Comparative Heights and Weights of Races by Age-Groups.

Race.	6-8 years		8-10 years		10-12 years		12-14 years	
	Age.		Age.		Age.		Age.	
	ins.	lbs.	ins.	lbs.	ins.	lbs.	ins.	lbs.
African, Zanzibar ...	48.8	53.5	50.7	59.8	53.2	67.9	57.7	83.9
Do. Pemba ...	46.0	46.0	50.5	56.5	54.4	61.6	60.3	87.1
Arab, Zanzibar ...	45.7	45.8	48.7	53.5	52.3	65.2	57.3	83.4
Do. Pemba ...	46.0	45.3	49.9	57.7	52.9	61.2	57.3	77.9
Indians ...	44.5	42.3	48.5	48.5	51.4	55.9	55.3	68.3

The naturally superior physical endowment of the African is clearly shown, but it is probable that the Pemba 12-14 years old Africans were a fortuitously exceptional group and that the Zanzibar measurements for this period are more truly representative of the young Swahili. It will be noticed that not until the age-period 8-10 do Indian children attain one pound in weight for each inch of stature. There is reason to think that this ratio is the minimum compatible with satisfactory nutrition and growth. After the earlier ages the divergence between the two terms should increasingly favour the weight. It is agreed, however, that examination of the individual child is the most reliable method of assessing its nutritional state and that no mathematical formula can replace it.

Reference again to the tables prepared several years ago shows that an all-round improvement has been achieved. It should be explained that at that date (1922) no Africans under 10 years and no Arabs under 8 were attending the public schools, and that the comparison deals with town pupils only. Table IV illustrates the advance :—

TABLE IV.

Age Group.	Africans.		Arabs.		Indians.		
	ins.	lbs.	ins.	lbs.	ins.	lbs.	
6- 8 years	—	—	—	—	+ 0.7	+ 4.1	+ = Gain.
8-10 years	—	—	- 0.4	+ 2.4	+ 1	+ 3.1	- = Loss.
10-12 years	+ 0.9	+ 3.8	+ 1.5	+ 8.2	+ 0.6	+ 3.5	N = No change.
12-14 years	+ 0.7	+ 7.4	+ 2.3	+ 16.5	N	+ 0.8	

This gratifying result is the harvest of the cumulative labour of years in the teaching of hygienic living, physical training, the fostering of cleanliness and self-respect and the ideal of fitness, out-door games and medical supervision, and it will be remembered that many of those earlier pupils are now parents or teachers and are themselves transmitting what they have received. All concerned in so wholesome an evolution are therefore entitled to look forward with confidence to further gains.

Cleanliness.—The figures are satisfactory for town children, although there is still room for improvement. The lower levels reached in the rural schools can doubtless be correlated with the conditions mentioned when discussing nutrition.

Nose and Throat.—Defects are, as would be expected, more numerous among town pupils and are chiefly enlarged tonsils, adenoids, and adherent uvula. Nasal polypi are very frequently found and are probably dependent on infective conditions in the sinuses.

External Eye.—The defects recorded are few and comprise conjunctivitis, blepharitis, corneal opacities, pterygium and squint.

Defective Vision.—Indians and rural Arabs show the highest percentage of visual defect. The Eye Clinic is readily resorted to, and parents generally show more willingness than formerly to provide the glasses prescribed for their children.

Ears and Hearing.—The commonest disorder found is otorrhœa, which is usually amenable to treatment, if persisted in. The percentage of defective hearing shown is very probably too low. One obstacle, among others, to more exact estimation is the almost inevitable plug of wax in each ear, so that preliminary syringing would be required for accurate results.

Intelligence.—The figures shown represent cases described as merely ‘Dull’, but the investigation of a child’s mental capacity, when, for instance, problems of its future and its vocational aptitude render exact appraisal necessary, is a process demanding more time than is often available during the routine examination of a school. Such a necessity is not likely to arise here in the near future and for the present observation of the pupil’s reactions during the examination, his replies to questions, and information given by the teacher lead to a sufficiently just opinion of his intelligence. A higher percentage of sub-normal mentality would have been anticipated owing to the prevalence of chronic malaria, hookworm, and malnutrition, but it has to be remembered that pronounced backwardness is seldom encountered in the schools for the simple reason that the child is not sent there.

Heart and Circulation.—Organic heart disease is very rare, the two maladies, scarlatina and rheumatism, which account for so much of the higher incidence in northern countries, being remote possibilities here. The disorders noted are tachycardia and functional murmurs associated with anæmia, the latter in turn being mainly dependent on hook-worm and malnutrition.

Lungs.—A catarrhal bronchitis tending to recur accounts for most of the cases. A few children were noted as needing supervision for possible indications of incipient phthisis. The incidence of respiratory affections shows a distinct diminution, the fall being particularly marked among Indian children, although they still have the highest rate.

Enlarged Spleen.—The noteworthy feature is the great difference between the town and the rural rates. It is not clear why the incidence in the town should be so much higher among Arabs and ‘Others’ than among Swahilis.

Other Diseases or Defects.—A very wide range of disorders appears under this heading. Skin diseases, scabies and tinea predominating; signs of rickets (rare); enlarged glands; ulcers; hernia; and deformities, such as kyphosis, lordosis, hydrocephalus, etc.

Laboratory Examinations.—Blood examinations for malarial parasites were carried out on the pupils of the Government Central School, the results being given in Table II.

Mwera produced the majority of the cases of bilharziasis discovered. The exceedingly high incidence of ancylostomiasis in the rural schools speaks for itself.

Treatment for these conditions is given at the Native Hospital, or the School Clinic, or at a neighbouring dispensary, but it should be noted that in the rural districts attempts to clear them up encounter obstacles caused by parental indifference, irregularity of attendance, and refusal of hypodermic medication.

B. PEMBA SCHOOLS.

Examination of School Children.—During the year 411 pupils were medically examined once from the seven schools in the Chake Chake-Mkoani area; the results of the examinations are tabulated below:—

PEMBA.

Nutrition :		Africans.	Arabs.
Good	...	33.9	38.5
Fair	...	51.5	50.8
Poor	...	14.6	10.7
Cleanliness :			
Good	...	51.8	60.6
Fair	...	4.3	0.8
Defective	...	43.9	38.6
Vaccinated	...	73.7	90.3
Nose and Throat	...	37.2	28.0
External Eye	...	0.72	0.87
Defective Vision	...	0.36	3.5
Ears	...	1.44	0.87
Hearing	...	0.72	0.87
Defective Speech	...	—	—
Sub-normal Mentality	...	16.4	14.9
Heart, etc.	...	1.44	3.5
Lungs	...	2.1	1.6
Enlarged Spleen	...	55.1	62.2
Other Defects	...	58.0	51.6
BLOOD: M.P.	...	39.7	14.0
URINE: Bilharzia	...	45.2	14.9
STOOLS: Hookworm	...	51.0	35.9

(1) *Poor Nutrition.*—Opinions on states of nutrition must vary as it is difficult to fix a normal standard amongst native children, and higher percentage of children suffering from poor nutrition this year than last year is accounted for by the fact that a higher standard has probably been used for the normal this year.

(2) *Cleanliness.*—There are very few children in the school with clean clothing and the prevalence of parasitic diseases of the skin in the form of scabies, various forms of tinea and occasionally lice is very great especially in the rural schools.

(3) *Diseases of the Heart and Circulation.*—Only organic cardiac disease is considered. Only three cases were of this nature, one with mitral stenosis, another with mitral incompetence and the third dilation with hypertrophy of the heart. Functional cardiac murmurs mostly of the hæmic variety due to anæmia resulting from ancylostomiasis, and bilharzia and malaria are common, while tachycardia is frequently observed due to these conditions and fear of medical examination.

(4) *Diseases of the Lungs.*—Only those giving definite physical signs are considered; they consist of simple catarrhal conditions of the larger tubes, asthma and one case of recent pleurisy.

(5) *Splenic Enlargement and Malarial Parasitic Index.*—These are both very high, especially in the rural schools. The highest parasitic rate was in Kiwani (77.14%) and Kengeja (71.93%) Schools. In none of the blood films examined were gametocytes found; it is difficult to explain why they were not met with in the blood of any pupils at schools such as Kiwani, and Ngwachani where no dispensary is handy for the treatment of malaria. The spleen rate is highest at Ngwachani (79.41%) and Kiwani (74.54%). The latter school was only opened this year.

(6) *Mental Deficiency*.—It has been necessary to rely for this on information supplied by the teachers.

(7) *Teeth*.—This examination was performed in a cursory manner and not with the care which would be employed by a dental surgeon. As these figures may be taken as the minimum, it is apparent that dental carries is very prevalent amongst the school children.

(8) *Diseases of the Ear*.—Only seven cases were found and these were cases of chronic otitis media. Wax in the ears however was present in a large proportion of pupils.

(9) *Diseases of the Eye*.—Were few; trachoma was not noticed. Owing to no vision testing card being available, the information supplied by the teachers had to be relied on; the pupils with defective vision had to be moved up into the front desks in order to see the writing on the black board. Cases of defective vision as judged by this method were few.

(10) *Intestinal Parasites*.—The percentage of children having ova of intestinal parasites in their stools is very high. Many of them showed eggs of two or all three intestinal worms.

(a) *Ancylostomiasis*.—There does not appear to be much difference in the percentage infected in the rural schools from that of the Chake Chake School except in the case of Kangani school (83.62%).

(b) *Ascariasis*.—The percentage of infestation with *ascaris lumbricoides* is considerably higher in the rural schools than in the schools of Chake Chake.

(c) *Trichuris Trichuria*.—Here again the percentage of pupils showing the eggs of this parasite is considerably higher in the rural schools than in Chake Chake Schools; the Girls School however shows a high percentages (31.58%).

(d) In a few cases eggs of *S. hæmatobia* have also been found in the fæces.

All the stools were examined by the floatation method of mixing a fair quantity of the fæces with an equal quantity of normal saline and glycerine.

There is a point of some interest in the figures for ascariasis and ancylostomiasis. As has been pointed out above, with the exception of Kangani and the Girls School, the percentage of pupils infested with *ascaris lumbricoides*, however, shows enormous variations. (3.54% in Chake Chake School to 40% in Kiwani School).

The sanitary conditions of the villages from which the children come to the various schools do not vary to any appreciable extent, although some of the pupils living in Chake Chake who attend the school there, probably live under somewhat better conditions; this however, cannot account for these enormous variations in the *ascaris* infestation, the ancylostome infestation remaining almost constant. The most likely explanation is the proximity of hospitals or dispensaries to these schools where pupils can be treated for these worms,—the pupils go to these places to be treated for hookworm, but do not continue to attend until they are cured of this; however, the few doses of oil of chenopodium is sufficient to rid them of *ascaris lumbricoides*. The constant amount of infestation with ancylostomiasis among the pupils of all schools, whether medical treatment is at hand or not, proves that the pupils of schools near medical institutions are not taking sufficient advantage of these institutions to rid themselves of hookworm.

(11) *Urinary Schistosomiasis*.—The urines of as many school children as possible were centrifugalized and the deposit examined for the eggs of *S. hæmatobia*. It will be observed that the percentage of pupils infested with this parasite is extremely high (81.25% in Ngwachani and 77.19% in Kengeja schools). The percentages given in these tables for this helminth must, as in the case of the intestinal parasites, be taken as the absolute minimum, because re-examination of the urines of these children which are found to be negative

on the first examination may prove positive on subsequent examination, as has happened in a few children. Further the presence of albuminuria should raise suspicions of the presence of this parasite, and call for repeated examinations for the ova in the urine. As regards this disease amongst the Chake Chake school boys many of the children come daily from the neighbourhood of Wawi, the streams of which are heavily infested with the cercariæ, and others have contracted the disease in other infected localities.

(12) Other defects were few. Enlargement of the liver was found in six children. Nasal polypi are extremely common and have not been mentioned in the table as no symptoms were produced by them.

C. THE DENTAL CONDITION OF SCHOOL CHILDREN.

A definite dental form for school children was prepared, and every child examined and found to have dental disease and requiring treatment was given a form duly filled in stating the nature of the work necessary to be done; but the parents seem to be so apathetic that the response has been very poor indeed, and out of 736 children examined over 550 required treatment, yet barely three hundred forms were received back.

This year great attention was given during the excavation of cavities to the conditions of dental caries and there were found

- (1) only three cases of caries humida
- (2) at least 55% to 60% with secondary dentine.

Secondary dentine is only laid down where there is a sound constitution resisting the advance of caries and so it would appear that caries is due chiefly to lack of oral hygiene and not to constitutional defects.

To combat this evil and so minimise the incidence of dental disease a "teeth-cleaning parade" was instituted in all the schools. This parade was to be carried out in front of the school teachers themselves in every school, every day. Early in the year the Dental Surgeon visited several schools and it was obvious to him that the parade was not being carried out. He lays stress on the necessity to him of the co-operation of the school teachers in combating dental disease in Zanzibar, by their seeing to it that the pupils do clean their teeth daily and conscientiously.

He comments thus: "There are so many ailments, the exciting and predisposing causes of which are unsavoury oral conditions, and the best way to get at the general population is through the school children. This tooth-cleaning parade must therefore be kept up diligently. It would also lead to the breaking down of the soft calculus that causes so much dental disease (not dental caries) that gives rise to pyorrhætic conditions, and so to a lowered masticatory power.

Convalescence is retarded when defects of the nutritional tract are present and with the knowledge possessed to-day, teeth must not be merely valued according to their importance in the appearance of the individual. Medical and public health workers value them rather according to their importance in the health of the individual."

During 1935 the following schools were examined:—

Dole, Government Central, Government Secondary, Teachers Training and Pemba. and the following schools treated clinically:—

Dole, Government Central, Government Secondary, Teachers Training and the Arab Girls School where the following work was done

Extractions	...	704
Fillings	...	334
Root fillings	...	4
Scalt and polish	...	32

PART OF THE "STONE TOWN", ZANZIBAR, FROM THE AIR.



Scale: Approximately 1 in 4800.

There are only three streets in this section which are open to wheeled vehicular traffic and one of these is so narrow that motor cars can only pass each other in parts. The second is a short cul-de-sac and the third is the main road following the seashore.

IV. HOUSING AND TOWN PLANNING.

The question of housing in the Protectorate resolves itself into a consideration of urban and rural areas. Of these the urban question is the more complicated, and the more difficult of solution; and of all the urban problems that of Zanzibar Township itself is the most outstanding.

Zanzibar Township covers an area of about $2\frac{1}{2}$ square miles, and affords accommodation for over 45,000 inhabitants housed in nearly 10,000 dwellings. The town is sharply divided into two parts i.e. the Stone Town, consisting of large permanent buildings and the Native Town, consisting of temporary huts, though there are extensions and infiltrations of each into the other. In last year's report a narrative description was given of the two parts of the town which need not be repeated here, but the two vertical air photographs published in this report afford a graphic demonstration of the problems awaiting the sanitarian and the town planner. The town as a whole is a parasitic growth on the island, which is too small to support it, and yet is attracted towards it to its own detriment. Policy is therefore directed towards the insistence of a high standard, so that the rural native who is anxious for an urban life is discouraged unless he is able and willing to comply with this standard, whilst the existing sub-standard urban dweller may eventually find that a country life affords greater peace, comfort and prosperity. A description of the methods employed to improve the sanitary amenities of the township are given below, but it must be realized that the methods employed in the Stone and the Native town are quite different, because whereas the Stone Town is a stabile unit susceptible of alteration in its component parts, but not in itself as a whole, the Native Town is labile and offers acceptable material for the operations of the town planner.

Zanzibar Stone Town.—The problem is mainly one of improving existing buildings for, owing to lack of money and space, few new one are being erected. Only when buildings become so dangerous as to necessitate demolition is there any possibility of new construction, but, though nothing spectacular can be presented to the passer-by, continuous improvements in buildings are being effected. In many cases these are initiated as the result of a sanitary survey made with the object of obtaining improved living conditions. Many difficulties have been met with in the past in the application of piecemeal sanitary orders intended to remedy specific nuisances, and it is customary now to make a complete sanitary survey of any building which comes under review. It is then possible to detail, for the guidance of owners all the particulars of work that it is necessary to carry out in order to put the premises in such a satisfactory sanitary state as to render them free of inherent liability to recurrence of nuisance. Through a practice of interviewing owners and talking over arrangements whereby the maximum progress of sanitary improvement of their property can be obtained, the measure of their real ability to carry out programmes has not been unregarded, and it is notable that many owners have not only co-operated to the full in the improvement of their property, but appreciated the advance made and collaborated still further by installing voluntarily such hygienic features as shower baths, glazed tile bathroom walls and other evidences of social and hygienic progress.

The problem of providing light and ventilation to the congested back-to-back bazaar shops, dwelling houses and large block lodging houses has at last been rather satisfactorily solved by the provision of internal open well spaces obtained by cutting out part of the buildings to the sky. Light and air has thus been obtained for rooms that were formerly in perpetual darkness and not least among the gains to occupants has been a saving in electric lighting.

The pressing concern of the sanitary authorities for the stricter control of building alteration and construction, and the close touch they have with problems of housing led in the early part of the year to transfer of the executive function of the Building Authority under the Town Decree (the Director of Medical Services and the Director of Public Works) from the Building Surveyor to the Medical Officer of Health. The organization of the executive function has been made to provide for correlation of the demands of the Streets, Drainage,

Sanitary, and Building Authorities and for the stricter control of building operations up to completion. The growing custom observed by owners of coming themselves, or sending their draughtman, to the Health Office to seek advice before the actual submission of plans for approval, has been a further proof of appreciation of the value and need of looking well forward to the possible effects of building construction upon health.

During the year rules for building in business locations under the Towns Decree have been drafted with a view to providing clearly defined standards for the future. Most of the provisions are matters for the engineers, but the sanitarian has been concerned with the preservation of open spaces, lighting and ventilation, facilities for town cleaning and with defence against mosquitoes and vermin.

The number of building applications dealt with in the Stone Town (or more accurately in respect of stone buildings) during the year and their disposal is set out below:—

I. APPLICATIONS FOR REPAIRS.

Applications.	Permits Issued.	Permits Refused.	Pending.
530	438	20	72

II. APPLICATIONS TO ERECT NEW BUILDINGS.

Applications.	Permits Issued.	Permits Refused.	Pending.
22	14	1	7

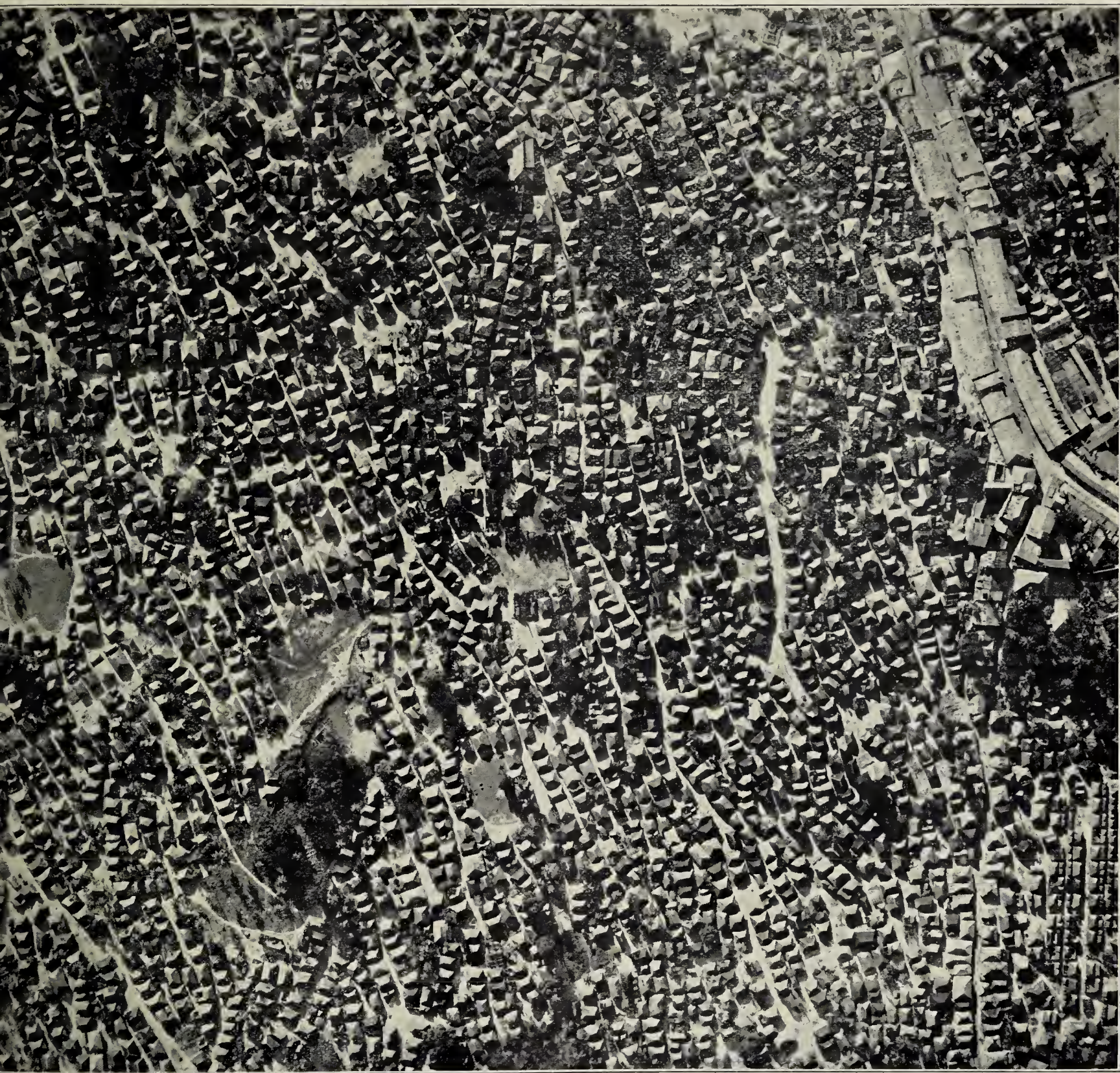
The Native Town, Zanzibar.—Housing in the native quarters of the township presents itself in the form of mazes of huts that are too close together to be established as separate sanitary dwelling premises and too disarranged to allow of any consistent following out of a system of co-ordinating them into manageable villages. To replace this jumble of unsatisfactory units by hut-plots that will permit of the essentials of individual air space and of sanitation, and to arrange them in such reasonable orderliness as will permit of organized communal services, is a task indeed. Approach through the individual hut does not lend itself as a method of very complete sanitary reform, and it is extremely doubtful whether it can afford any much greater degree of satisfaction in the building and town-planning reform which are so inseparably a part of the sanitary betterment. Nevertheless, a real attempt has been made during the year to try and obtain some progress from the impasse that seemed to have been reached. Erection of new huts, and erection includes certain work deemed to be of the nature of reconstruction, was permitted during 1935 only where a plot of 25 feet by 50 feet was available, or under certain town planning considerations, one of 25 feet by 30 feet, and where the plot was separated from other buildings by a ten-foot wide space all round. Such a plot allows of the building of a kitchen and pit-latrine at the rear corners of a yard, the space of which open to the sky then remains equal to about one-third of the whole plot area. Further considerations of siting of plots had, however, to be taken into account, such as relation to proposed system of roads, healthiness of the level of the ground, and the general arrangements of the building area.

The restrictions thus imposed on new building and on reconstruction have given the satisfaction that the previous largely uncontrolled completions of further unsatisfactory huts, and the encroachment on open space that went on surreptitiously in many areas, have all to a large extent been arrested. On the other hand the number of huts out of repair has obviously increased and the difficulty of finding a new building site in the vicinity of an old home may result in what is understandably regarded as a hardship.

Further complication in arranging plots in the native quarters is caused by the existence of coconut trees, whereby scavenging is rendered difficult. Pity over the sacrifice of an economic tree is understandable, but the impediment they can be to proper hut lay-out and to the use of sanitary lanes needs to be understood also.

Zanzibar has no Housing Acts and the conception of the clearance area has not yet been adopted to meet the situation. It thus happens that at the moment the problem faced is something like that presented by a jigsaw puzzle set out on a table, the pieces disarranged but all touching, the task being to arrange the pieces to form an orderly picture, and the rules being (1) that,

PART OF ZANZIBAR "NATIVE TOWN" FROM THE AIR.



Scale: Approximately 1 in 4800.

There is only one road in this area and that is closed to motor traffic, though cars can be driven down it. The rest of the lanes are merely sandy spaces between houses varying in width from a few inches to twenty or thirty feet. They are not open to motor traffic, though the lorry used for emptying sullage pits finds its way through most of this part of the town.

each being a human factor, it may be touched only when it asks to be touched (2) that it will ask to be re-shaped, but it may only be re-shaped to certain standard sizes, (3) that it will not want to be moved or certainly not far. (4) that no other piece must be jogged and (5) that there are landlords' lines on the table that have to be respected. The only help afforded the player is a possibility of clearing some of the pieces right out by a system of recommending compensation for owners of sacrificed units. Compensation is, however, in practice paid only in respect of huts of the native areas of the Zanzibar Town, and it has, moreover, the disadvantage in Zanzibar that claim for its employment arises in each case out of an application by an individual to reconstruct some hut, and not at the initiative of the authorities themselves. As in the present chaotic arrangement within an area, any application to erect or reconstruct may well be inadvisable, the principle of compensating becomes strained.

The following applications with regard to native huts were received during the year:—

<i>a.</i>	To erect new huts	...	258
<i>b.</i>	To re-build old huts	...	178
<i>c.</i>	To repair huts	...	1,084
Total			1,520

Many more applications in respect of native huts have been written out at the office of the District Commissioner, but very frequently the African refrains for months—even a whole year—before he decides to submit the application. Even then he has probably only accumulated sufficient savings to begin building. His plot is then marked out for him and the extent of the buildings on it are indicated. The real supervision is now only beginning, for completion may be done in spurts distributed over a long period of time. Not until the whole premises are completed, however, is a certificate for occupation now granted.

The supervision of the actual progress of work brings to light several common practices during construction tending to nullify the healthy form of native house lay-out that has been devised. One of these practices is the enlargement of the main hut or out-buildings, or making additions to them, so that the minimum open space proper to the dwelling is diminished. This defect usually comes about through connecting the latrine-bathroom, or the kitchen, from its rear corner of the plot up to the house itself by a covered passage alongside the compound fence. The next step is to convert such passages into lodgers' rooms, or into a new kitchen, the old kitchen then becoming a separate dwelling house.

To help native hut builders to build out of income, the practice of erecting the out-buildings first and living in them while the rest of the hut was a building used to be allowed, but this concession was widely abused. Such out-buildings were more often than not retained as dwelling houses, particularly if any latitude had been allowed in the building of them to larger than standard size.

The difficulties of native housing have been related to the always pressing need for accommodating a vast army of immigrant labour, and to the cost of land in the town and the cost of building work. Bachelor lodgers mean help with the rent. Overcrowding then results in building subterfuges. Correction in one place is compensated, in the present state of economics, by attempt at subterfuge elsewhere. It is not easy, therefore, to blazon very clearly the way to improved housing by mere individual examples of better plots set out here and there through the whole vast area of native housing. Yet, till the satisfactory solution of the problem of improving the housing of Zanzibar is accomplished, the Town must regard this side of its sanitation as lagging behind the other sides.

Pemba.—In the three townships of Pemba, Wete, Chake Chake and Mkoani, the problems are very much the same as in Zanzibar, but on a much reduced scale and in not quite so acute a form. In Chake Chake Town native quarters are so congested that they are not represented as separate huts on the Township Survey map. In this town 272 building applications were dealt with during the year, and in Mkoani 52. In Wete building control is largely in the hands

of the Public Works Department and the Provincial Administration, but similar conditions do exist.

A marked improvement in the business area of Chake Chake Township has been effected by the widening of the main street to which shop owners contributed by sacrificing the greater part of their shop verandahs.

Rural Housing.—The problem of rural housing is at least a little more free from the stumbling block of all this fixation of sites, narrowness of available spaces, need for provision of roads and such forms of communal space, that is encountered in the native quarters of the town. Any progress in the country would appear to be only obtainable through education in the subjects of wise siting of villages and houses, and of better and more sanitary construction of buildings. The country hut is less often provided with a latrine than its counterpart in the town, but, when it has a latrine, this convenience is much more often situated outside the dwelling itself. On many premises a little ablution place, ringed round with coconut leaves, constitutes another out-building. The kitchen is frequently part of the verandah, or is the hall or even an inner room. Single roomed huts are numerous in the country; unusual in the town. The following statistics may serve to illuminate the differences.

	Mkokotoni rural.	Mangapwani rural.	Kisimamajongoo Zanzibar Town.
Number of huts seen	... 2,254	3,735	100
Number of inmates	... 4,921	8,448	352
Average number of inmates to a hut	... 2.2	2.3	3.5
Number of one-roomed huts	... 1,666	2,994	2
Number of inmates in one-roomed huts	... 3,620	6,341	4
Average number of inmates in one-roomed huts	... 2.2	2.1	2
Number of two-roomed huts	... 588	741	11
Number of three-roomed huts	... —	—	77
Number of four or more-roomed huts	... —	—	10
Total number of huts with more than one room	... 588	741	98
Number of inmates in huts of more than one room	... 1,301	2,107	350
Average number of inmates in huts of more than one room	... 2.2	2.9	3.5
Percentage of total huts represented by huts of more than one room	... 26%	20%	98%

The usual country home consists of a family of two to three people; seldom are there more than five or six in one hut. The "lodging house" of the town native quarters hardly exists. A small plot, therefore, accommodating only a small dwelling of two rooms, and out-buildings for latrine and kitchen, seems all that is needed for people in the country. Construction of their huts may, however, be improved by attention. There are problems to be considered of impervious flooring, of burglar-proof windows, and of native building materials that might be cheap, lasting and unlikely to harbour vermin. Progress in these matters is a matter of education for all concerned.

Town Planning.—The necessity of a town planning scheme is generally recognized and a Town Planning Decree is included in the Laws of the Protectorate. There is unfortunately no suitable modern map of the town which would allow a scheme to be formulated, but arrangements are being made for the town to be photographed from the air and a map of scale 1 in 2500 to be prepared. When this is available, a scheme for the "native" town will be put in hand, and consideration will be given to what can be done for the "Stone" town.

V: FOOD IN RELATION TO HEALTH AND DISEASE.

(a) DIETETIC.

The chief articles of food in the Protectorate are cassava, fish, coconut and rice. Cassava is grown by the small holder and squatter throughout both islands. It is gathered throughout the year but in larger quantities from October to February, and from the sandy loam country eastwards slightly earlier than from the western lands which are said to have originated as deposit from muddy waters. It is an African staple; it is eaten both fresh and dried, and the dried cassava is also powdered and much used for porridge and bread (cake) making.

Fish is consumed almost universally through both islands but particularly in the rural areas. In the coastal villages it is eaten chiefly in the fresh con-

dition; in the inland villages a large proportion of the fish is eaten dried. Dried shark in the towns is an obvious staple: during the shark season, about February, the shark markets are piled high with the commodity. When first landed in Zanzibar it is stored in large salt water tanks. More than eight hundred tons of dried fish were imported into Zanzibar in 1935, which could have afforded about a third of an ounce a day to every inhabitant in the Protectorate.

The Coconut is the universal provider among the Africans of cooking oil. It is more plentiful in Zanzibar than in Pemba and on the east side of Pemba than on the west. The oil is expressed in water from the shavings of the white of the nut and used for cooking rice, bananas, cassava and other foods. About half a coconut for every head of the African population is probably a very fair estimate of the daily extent of its use.

Rice vies with cassava as the bulkiest item in the dietaries. In Pemba much rice of many types is grown, particularly away from the clove growing areas. After the food shortage experienced in that island in 1933, much more land was planted up with it. In some of the villages of the eastern and more aboriginal side of the island storage of local rice in the homes continues for four or five months after the harvest of July and August. Less growing of rice is evident in the Zanzibar Island. During 1935 over sixteen thousand tons of rice, that is about two-fifths of a pound for every head of the population a day, were imported into Zanzibar from other countries. Much of this is consumed by the Indian town populations. The proportion of it passed on to the townships of Pemba is comparatively small: only 1,133 tons apparently reached that island in 1932 and only 319 in 1933. The imported rice is almost all polished. The home grown rice is also home pounded rice and so retains its germ layer.

The foods of the next rank of importance in the Protectorate are bananas, meat, grains and legumes, fruits and vegetables, and sugar. In Zanzibar sweet potatoes are widely cultivated, but in Pemba less widely.

Bananas alternate with cassava and rice as chief part of one of the main meals of the day. They are generally cooked in the coconut juice.

The use of meat is rather restricted as to localities and times. A fair amount of slaughtering takes place in the towns, and an ox is killed fairly regularly once or twice a week, or at longer intervals, at a few villages and points in the country. Fish, however, rather than meat, is the chief animal food. The month of *Ramathan*, or congregations of labour in a district for clove picking, may lead to a marked increase of slaughtering for a time. During 1935 following imports of animals occurred:—

Cattle.	Goats.	Sheep.
2,015	6,690	1,330

and the following slaughterings took place in the town slaughter houses:—

		Cattles.				Goats.	Sheep.	Pigs.
		Oxen.	Cows.	Calves.	Buffaloes.			
Zanzibar Town	...	1,960	596	77	3	9,970	1,227	22
			2,636					
Chake Chake Town	...		223			37	0	0
Mkoani Town	...		56			30	7	0

The consumption of this meat has, however, probably been very unevenly accounted for by the various races.

Grains and Legumes.—Kaffir corn, maize and bulrush millet are the chief grains crops. Kaffir corn (*Sorghum vulgare*) known as “mtama”, is also imported to the extent of over two thousand tons a year. In the Zanzibar Island maize, and in Pemba bulrush millet (*Pennisetum typhoideum*), known as “maweale”, is the next most important grain crop. A further grain is Eleusine corcana, known as “uwimbi”. In both islands the grain growing districts are to the east. Some villages can be found subsisting entirely on the crops they succeed in harvesting from among the eastern “coral rag”.

Of legumes, red gram (*Cajanus indicus*), known as “mbaazi”, *Vigna sinensis*, known as “kunde”, *Voandzeia subterranea*, known as “njugu-mawe”, and green gram (*Phaseolus mung*), known as “choroko”, are all fairly generally raised.

Fruit and Vegetables.—Mass statistics of these would be difficult to obtain but it is doubtful whether fruits and green vegetables are consumed in sufficient quantity, especially by males, to provide by themselves anything like adequate vitamin-A.

Apart from the big variations of dietary among the different larger racial and social groups, such as Mohammedan Indians, Hindus, Arabs, Shihiri peoples, and Africans, there are differences to be observed from one village to another, and from one season to another. An amusing difference between the diet of the Zanzibar native and that of the Pemba native is noticeable in the relative amounts of sugar consumed: the reputation of the Pemba native for liking his tea sweet is, indeed, quite a well known joke. It is nearly always possible to find a native chewing sugar cane somewhere in the streets of Chake Chake Town. No greater incidence of glycosuria has been observed in Pemba, however. Between five and six thousand tons of sugar, or about two ounces a day for each inhabitant, were imported into the Protectorate during 1935. Some forty tons of molasses were also imported into the country during the year, but this goes chiefly to the making of sweetmeats for the Arab and Indian communities. Another form of sugar importation was in the form of over one hundred and seventy tons of milk, mostly of the sweetened variety. In many native villages the use of condensed milk is much more common than that of fresh milk.

Deficiencies.—Of deficiencies in the diet the one that is most often discussed is that of animal oils. The cooking oil, coconut juice, is an expressed oil and very poor in carotene. Milk is not consumed in the country to the extent suggested by the numbers of cattle seen: it is taken to the towns and sold to milk consuming peoples there. Animal fat is not widely consumed in any form. The extent to which fish supply the apparent deficiency in Vitamin-A is not easy to measure. The widespread practice of chewing lime and areca nut with several betel leaves may well be in part due to a want of the carotene which the betel leaf affords in good quantity. Similarly, the love of beans, tomatoes and chillies may be explained. The advisability of trying to encourage an importation of red palm oil to supply the apparent carotene deficiencies in the Protectorate dietaries has been under discussion. When the Prison diet was revised, attempts were made to obtain maize in the yellow form to ensure adequate supplies of the Vitamin-A precursor. Samples of maize imported, however, were found to be all of white maize, with a few yellow grains only among the white. The effects of the improved prison dietary may be read in Section VII.

In connexion with the question of Vitamin-A adequacy interest has been increased in the importations of ghee. The table below shows the imports of the various oils under this name:—

GHEE—CLARIFIED BUTTER.		
Origin.		Quantity in lbs.
Kenya	...	171,388
Tanganyika Territory	...	121,996
India	...	84,322
Socotra	...	67,647
Italian Somaliland	...	45,672
Belgian Congo	...	5,233
Arabia	...	4,196
Total	...	500,454
GHEE—(VEGETABLE).		
Japan	...	18,000
Holland	...	15,120
Great Britain	...	427
India	...	288
Total	...	33,855
GHEE—(FISH OIL).		
Japan	...	164,000
Arabia	...	13,545
Total	...	177,454

The total oil import could afford about three pounds of oil to each head of the population in the course of the year, but not quite all of this oil is of animal origin.

A Vitamin-B deficiency has also been supposed in the African dietaries of the Protectorate, particularly on the east side of Zanzibar Island where in remote villages nervous forms of avitaminosis-B were observed in 1933. It is difficult to demonstrate the relationship of nervous cases of atypical beri-beri form, such as often occur in small waves at hospitals, especially after the wet seasons, to the dietaries of individual patients; the small but motley group of nervous diseases of uncertain origin needs investigating as to its relation to food deficiency, syphilis or other specific infection. One perhaps significant feature of some of these nervous cases is only obtained in case history taking: it is an onset as diarrhœa.

The chief Vitamin-B containing articles of diet eaten in the Protectorate are probably the pulses and legumes. Though it is difficult at the moment to show very certainly how much of the diet these vegetables form throughout the year and over the whole mass of the people, it surely may be deduced from the high carbohydrate and low protein and fat proportions in the food in general, that a Vitamin-B deficiency is almost certain to exist.

The epidemic of ulcers in 1933, so marked in Pemba, coincided with a dry year, food crop failures and poverty. This coincidence remains in mind, although the seasonal variation of ulcers does not seem similarly explicable by any food crop variation, but rather is associated with the weather and, perhaps, field work, and thus possibly with skin cleanliness combined with the exposure to minor injuries. General deficiency of food, or exacerbated seasonal imbalance in dietary, may yet, however, be demonstrated as potent factors in lowering resistance in the population to ulcers, skin disease and even helminthic infection.

The Medical Officer in Wete ascribes the increased respiratory disease incidence there to malnutrition and avitaminosis and comments on the favourable effects of treatment with Marmite.

(b) WHOLESOMENESS OF FOOD.

Ghee came into prominence in the first place during the year on account of the wide use of the term to cover imports of varying nature and monetary value. Adulteration of food or the loss of wholesomeness, and the protection of food from contamination by flies and dirt, are all matters dealt with through a Food Section of the Public Health Decree, Cap. 60, Revised Laws of Zanzibar, and the Public Health Rules, 1932.

The following table gives the amounts of various forms of food condemned in the Protectorate during 1935 as unfit for human consumption:—

		Zanzibar.	Chake Chake.	Mkoani.
Dry fish	...	7,465 lbs.	—	—
Fresh fish	...	124 „	65 lbs.	20 lbs.
Beef exposed for sale	...	21 „	40 „	—
Fruits	...	39,398 „	200 „	—
Vegetables	...	37,320 „	40 „	—
Onions	...	50 „	16 „	—
Milk fresh	...	—	6 pts.	—
Condensed Milk	...	4,748 tins	—	—
Wheat flour (mostly from Customs)	...	19,871 lbs.	—	—
Dates	...	16,665 „	—	—
Vermicelli	...	228 „	—	—
Eggs	...	200 „	—	—
Sweets	...	157 „	—	—
Aerated water	...	—	11 bots.	7 bots.
Cigarettes	...	80,000	—	—

Prosecution was deemed necessary in a few cases, twice against fishmongers for exposing rotten fish for sale, and once against meat sellers in the market for soaking meat under a water tap to increase its weight. In the last case no conviction was obtained, the soaking not being "immersion" which the law alone forbade.

The following figures of food condemnation are given for the year 1935 by the Veterinary Officer under the Department of Agriculture:—

	ZANZIBAR.			
	Oxen.	Cows.	Goats.	Sheep.
Meat wholly condemned at slaughter house ...	34	1	21	5

In the Chake Chake slaughter house 87 viscera were condemned, and in Mkoani one ox.

The Zanzibar slaughter house has received during the year a very essential protection against crows in the shape of an expanded metal grating.

Extensive measures of fly proofing of markets in all the townships have been advocated for the year 1936 besides many other improvements to obtain greater facilities of cleaning and draining.

Control of food-storage premises, "eating houses" (restaurants), hawking of food, bakeries, sodawater factories, purveying of milk is obtained through a system of licences, dependent on recommendation to the effect that the rules in law for their conduct are being observed. Hawkers are fairly closely controlled, their wares now being carried or perambulated in covered and fairly hygienic cases. "Eating houses" are very numerous, a large part of the population being addicted to the continental custom of taking meals regularly at restaurants. In Chake Chake a great reduction of the eating houses, and improvement of those remaining, was effected two years ago. In Zanzibar the process of bringing eating houses up to the standards of the law is proceeding slowly, a nearer approach to the standard being expected each year that a new licence has to be sought. In Zanzibar, too, every grade of food seller seems to abound, from the plain hawker of coffee or cakes or ground nuts, through the case of the man with a fixed stance next a fire on a verandah, to the man who provides benches for customers outside the verandah, thence to the Arab "Boko-Boko" man who boils his chickens with grain in a cauldron on his verandah and usually merely sells cooked meat but occasionally accommodates guests, or to the Arab maker and seller of sweetmeats whose friends sit on the verandah with him. Among this variety of hawkers, eating house keepers, and the sellers of bread which has been baked in bakeries on other premises, and the true restaurant keepers and the keepers of "clubs", it is not easy to preserve an application of standard rules that is fair, according to the letter of the law, and at the same time best promotes the interests of health. The most important particulars at the moment in which protection of food is called for in further measure are the covering of bread exposed for sale by the ordinary shopkeepers, and some form of systematic control of milk from the cow to the consumer.

Milk.—There is in the Zanzibar Town a cattle station under the Veterinary Division of the Department of Agriculture. Here all town cows are housed and milked. Some of the milk goes direct to two or three larger selling dairies. Some goes to the market where it submits to lactometer reading. A still greater part of the town milk, however, comes in from the country districts in milk cans on the backs of bicycles ridden by purveyors. All these purveyors have to report once a year to the Health Authorities before being recommended for licence. There is thus a measure of control of the health condition of dealers in milk and of the type of vessels employed. In the market there is some check by the lactometer on adulterating practices. There is, however, no systematic method of ensuring a clean milk supply. There is no provision for, and no insistence upon, can scalding, and the cleanliness of the milk is largely taken on faith. As, too, much milk comes into town in the evening and does not pass to the market, and much goes direct from Town Dairy to selling dairies, it is also merely an assumption that no adulterations ever take place. The question

of establishment of can scalding facilities and perhaps a pasteurising plant and of regulating more strictly the sale of milk after arrival in town is under discussion.

Water.—The subject of water cleanliness is dealt with in detail in the Pathologist's report in Section IX. In the country districts the sources are stone wells with protecting walls made by public benefactors, or shallow water holes in valleys or at the sides of streams. Wete Town has a good clean catchment area round a spring outside the town. Chake Chake has a spring that might well be contaminated from the town itself, but the water is now treated with a Patterson chlorinating plant. Mkoani is badly provided with water, but the deep well that was sunk in 1934 and failed then to produce any large quantity of a more satisfactory water supply is now reported to be filling better. Some of the advantages that would accrue from the extension of the high pressure Zanzibar Town water supply to further sections of the native quarters on the outskirts of the town have already been stressed in other sections of the report. To them may now be added that of a more widespread use of a supply on the safety of which a constant watch is being kept.

The Medical Officer at Wete calls attention to the necessity in that township, also, of extending the water supply if the rapid growth of Wete is to develop in a healthy manner.

B. MEASURES TAKEN TO SPREAD THE KNOWLEDGE OF HYGIENE AND SANITATION.

Preparations were made during the year for collaboration with the Department of Agriculture in a show to be held at Mahonda in the country. Unfortunately the show had to be postponed, but it was hoped it would be held in 1936.

The lectures, or rather talks to be illustrated by exhibits, and which the senior rural dispenser was being trained to give, were to cover such subjects as :

(1) *Housing*, with a view to contrasting satisfactory and unsatisfactory forms of native premises, and discussing possibilities of introducing such features as (a) model bore-hole latrines with suitable tops, (b) burglar-proof expanded-metal windows, (c) other forms of material for wall, roof or floor construction (reciprocal education) and (d) separated kitchens.

(2) *Diet*.—Informative talks on the essentials of dietaries, and discussions on how far the samples of diets exhibited furnished the essentials and by what possible additions they might be improved.

(3) *Water*.—Illustration at near-by streams of dangerous ways of obtaining water supply and of methods of protection.

(4) *Diseases*.—Fever, hookworm diseases, schistosomiasis and ulcers to be treated without too much stress on the symptoms of the troubles, but merely using them as underlying reasons for

- (a) mosquito destruction and avoidance;
- (b) latrine and perhaps footwear provision;
- (c) bathing stream care;
- (d) cleanliness of clothing, houses and skin.

(5) *Maternity and Child Welfare*.—Uncertain. On some such lines as these rural dispensers are expected to talk on their visits in the villages. At their dispensaries they have show-cases of exhibits. In the villages they are expected to give practical advice. The training of the dispensers themselves is, however, lagging behind, and their personalities are of varied measure. Nevertheless, it is rather by personal talk, personal example and even enforcement of the more necessary hygienic observances, than by the written word or the stated lecture or than even by the show, that education of the African has to proceed.

Boy Scout Camps, one of boys from the Central School early in August and one of about 30 Comorians later in that month, were held out at Mangapwani. The opportunity was seized to try and inculcate through a sanitary inspector and a rural dispenser the principles of camp sanitation.

In the course of the rural sanitary surveying by a sanitary inspector in Zanzibar and by a Comorian investigator in Pemba, constant advice on how to improve the health of the villages has been fairly steadily imparted.

The crux of the problem, however, remains, the creation of good hygienic conditions in the native township areas whence fashion may spread to the country.

Museum.—The Zanzibar Museum has a large number of exhibits illustrating almost all the various aspects of Public Health and providing excellent material around which to lecture to departmental personnel and every class of the public.

C. TRAINING OF SANITARY PERSONNEL.

Training of personnel is for the time being almost in abeyance. The school of rural dispensers has lapsed as regards regular courses of instruction. Until the formulation of a comprehensive scheme of education and instruction, the present personnel have to suffice, with such training as their officers can afford to give them in the course of their duties.

SECTION IV.

PORT HEALTH WORK AND ADMINISTRATION.

Throughout the year the duties of Port Medical Officer were carried out by the Pathologist, in addition to his other duties, the appointment having been made for administrative reasons. This transfer of duties from the Medical Officer of Health was made possible by the provisions of the Zanzibar Quarantine (Amendment) Rules, 1935, which came into force on 23rd February, 1935.

These Rules provided for a simplified method of granting free pratique under certain conditions, the essential features being that "clean" ships arriving in Zanzibar are automatically granted free pratique on arrival in harbour, subject to receipt by the Port Medical Officer, from the ship's agents in advance, within certain time limits, of a Certificate of Freedom from Infectious and Contagious Disease, and on arrival of the ship of a Ship's Health Declaration, both documents to be in a prescribed form.

This system enables a clean ship to enter harbour without display of quarantine signals, so that she may be boarded at once by her agents and stevedores, and work on cargo commenced, a great convenience to ships arriving at hours when the port is not officially open for clearance of ships. Further, it dispenses with the necessity for the Port Medical Officer himself to board clean ships on arrival, though a Sanitary Inspector and vaccinators continue to board all ships carrying passengers to note any evidence of sickness among passengers disembarking, and to vaccinate native passengers whose vaccination state is considered to be unsatisfactory, before they are allowed to land.

There was a certain degree of confusion when the new system was first applied, a number of ships which had been granted free pratique continuing to enter harbour showing quarantine signals, and conversely failing to show such signals when simplified pratique had been refused; but such misunderstandings had practically ceased to occur by the end of the year.

An unfortunate result of the application of the simplified pratique system was that the general public, becoming used to boarding ships without hindrance immediately on arrival, was inclined to disregard quarantine signals on occasions when existence of infectious disease in neighbouring ports made it necessary to suspend the application of the system temporarily. Strict enforcement of the provisions of the Quarantine Decree, 1927, has overcome this difficulty.

During the year suspension of simplified pratique to all ships calling at Mombasa was applied from 27th June to 12th July on account of the occurrence of cases of Small-pox in the neighbourhood of that port; also to all ships calling at Kilwa from 24th October to the end of the year, on account of small-pox.

Suspension of simplified pratique was also considered necessary in the case of two individual ships, viz:—S.S. "Tairea" from Bombay, reported by the agent to have a case of chicken-pox on board, which it was desirable to see on account of small-pox in Bombay, and S.S. "Randfontein" carrying returning pilgrims from Mecca. In this latter case, the precaution proved to be justified, as small-pox subsequently occurred in Mombasa among Mecca pilgrims landed there by another ship.

No ships were placed in quarantine during the year.

A Deratisation Exemption Certificate was issued to one ship, after inspection.

Two steamers on arrival reported the death of a passenger since leaving the last port of call. In each case the passenger was an Indian, and the cause of death was heart failure in a person the subject of advanced pulmonary tuberculosis.

Dhows were visited by a Sanitary Inspector on arrival and were inspected for infectious disease, but no such cases were found. All persons landing from dhows were vaccinated before landing unless evidence of previous small-pox or recent vaccination was found.

During the year, 550 ships and 1,152 dhows arrived in harbour, from which were landed 10,261 and 2,378 immigrants respectively.

Vaccinations carried out on passengers landing totalled 1,802, and on passengers before embarking 3,029.

Quarantine Island.—This is a small island situated some three miles from Zanzibar Town, and is the Quarantine Station for the combined East African Territories. On it are buildings specially erected, and a disused prison, capable of accommodating some 1,200 passengers.

It is in charge of the Port Medical Officer, who is responsible for its maintenance in a condition ready for instant use. A staff of 4 natives under a native caretaker is maintained to keep the neighbourhood of the buildings clear of grass and bush, and to maintain the buildings themselves in clean condition.

Necessary repairs to buildings, which suffer from the ravages of termites, were carried out by the Public Works Department this year. These included replacement by steel bars of wooden beams destroyed by termites, and repairs and painting of the European bungalow, Sub-Assistant Surgeon's bungalow, the store, Native Staff quarters and of most of the quarantine buildings.

Expert inspection of the boiler of the Washington-Lyon disinfector by the Public Works Department showed much fouling, requiring immediate action, which was taken, and this work was progressing at the end of the year.

When not required for quarantine purposes, the European and Sub-Assistant Surgeon's bungalows may be rented for holiday purposes by European and Asiatics respectively. During the year the sum of Rs. 111 was collected on this account.

SECTION V.

MATERNITY AND CHILD WELFARE.

By far the greatest part in activities devoted to Maternity and Child Welfare is taken by the Zanzibar Maternity Association, a private body subsidized by government and controlled by a general and an executive committee of representatives of the various communities interested, with the Director of Medical Services as President. The Executive Committee, which in the beginning was a small body consisting of office bearers and a single representative of the communities, was responsible for controlling the activities of the Association, but in recent years this body had grown to such a size as to hamper its own activities very considerably. It consisted of nearly twenty members, including not only one representative of every community concerned, but representatives of private charities and trusts. The financial position of the Association caused some anxiety during the year and, as Government is now the only contributor to the Association, except for moneys received as fees for services rendered, it was considered desirable to regain the control previously exercised which had been lost by the inflation of the Executive Committee. The General and Executive Committees suspended their activities whilst negotiations, with a view to formulating a new and more satisfactory constitution, were proceeding. No decision had been arrived at by the end of the year and the business of the Association was continued under the direction of the office bearers.

At the beginning of the year, the activities of the Association fell into three categories. The Town Midwifery service, which maintained three midwives who undertook the care of cases in their own homes on the payment of a fee to the Association; the Mwembeladu Maternity Home, under the care of the Matron Midwife and two assistant midwives, which is mainly a charitable organization, where the poor of all races, but mostly Swahilis, are admitted and treated without fee, though in certain cases small contributions are occasionally levied, and the rural maternity centres, six in number, each under the care of a locally trained native midwife, and which perform the same functions in rural areas as the Mwembeladu Home does in the town. These rural centres were so placed as to be very difficult to control or supervise, the houses were unsuitable for the purpose to which they were put, and the midwives were neither highly enough trained nor reliable enough to practise their craft independently or without continual supervision which could not be given. Moreover, with one exception, they were very poorly attended, and representations from the Matron Midwife had been received recommending that they should be closed on this account.

In January, government took over these rural centres from the Association and in February the Senior Medical Officer and the Acting Matron undertook a survey of the centres. Their report left no choice but to close down five of the centres, leaving one, Makunduchi, open for further observation. This was done.

THE WORK OF THE ASSOCIATION.

A. *The Mwembeladu Maternity Home.*—One hundred and six cases were admitted to the home during the year of whom seventy were African natives. Ninety-one women gave birth to live children, including one case of twins, five had still born children and ten aborted. One maternal death (an emergency case) and one infantile death were recorded.

9,546 new cases attended the dispensary and there were 29,991 re-attendances of which 2,987 were ante-natal, 2,125 post-natal and 7,461 gynæcological cases.

B. *The Town Midwifery Service.*—The three town midwives attended 348 women in their own homes, the great majority being Indians and Arabs. No maternal deaths were recorded but two infants died whilst the midwives were in attendance.

C. *The Rural Maternity Homes*.—Five of the six homes were closed early in the year, one only at Makunduchi remaining open. 177 women were attended during the year, of whom 131 were seen at Makunduchi. All the cases but seven were natives of Africa. One infantile death was recorded and there were no maternal deaths.

The following tables set out by races, the women who were attended by the Zanzibar Maternity Association or at the Rural Maternity Centres and the results.

Race.		Cases.	Live babies.	Still births.	Abortions.	Maternal deaths.	Infantile deaths.
Ithnashen Khojas	...	101	72	11	18	1	—
Bohoras	...	57	46	1	10	—	—
Hindus and Bhatias	...	81	76 ⁽¹⁾	2	4	—	—
Other Indians	...	56	53	3	—	—	1
Total Indians		295	247 ⁽¹⁾	17	32	1	1
Arabs and Comorians	...	86	79 ⁽¹⁾	5	3	—	—
Wahadimu	...	167	165 ⁽¹⁾	3	—	—	1
Swahili	...	72	58 ⁽¹⁾	5 ⁽¹⁾	11	—	1
Other Africans	...	6	6	—	—	—	—
Total Africans		245	229 ⁽²⁾	8 ⁽¹⁾	11	—	2
Total all races		626	555 ⁽²⁾	30 ⁽¹⁾	46	1	3

(¹) Includes 1 case of twins.

(²) Includes 2 cases of twins.

(³) Includes 4 cases of twins.

It will be noticed that the Still Birth and Abortion rates are very high, particularly amongst the Indian community. A comparison may be made of these urban figures with the figures for rural populations given in the vital statistics section of this report.

SECTION VI.

HOSPITALS AND DISPENSARIES.

In the following tables A and B the details of the work carried out at the various Government hospitals and dispensaries is tabulated.

TABLE A.

Medical Units, Beds and Patients by Districts.

MEDICAL UNITS.	Zanzibar, Island.		Pemba Island.		Total.
	Zanzibar Town.	District.	Towns.	District.	
European Hospital	...	1	—	—	1
Asiatic and African Hospital	...	1	3	—	4
Police Lines	...	1	—	—	1
Prison Infirmary	...	1	—	—	1
Infectious Disease Hospital	...	1	—	—	1
Walezo Poor House Hospital	...	—	1	—	1
Sub-Dispensaries	...	2	13	7	22
Mental Hospital	...	1	—	—	1

IN-PATIENTS.

Beds available:

European	...	14	—	—	14
Asiatic and African in Hospitals	...	96	100	—	196
Africans in Hospitals	...	98	180	—	278
Total	...	208	180	100	488

Cases admitted:

European	...	78	—	—	78
Asiatic and African in Hospital	...	1,961	454	1,268	3,683
Africans in Sub-Dispensaries	...	—	92	—	92
Total	...	2,039	546	1,268	3,853

OUT-PATIENT ATTENDANCES.

Hospitals	...	84,566	31,764	35,468	151,798
Sub-Dispensaries	...	41,494	68,635	52,133	162,262
Total	...	126,060	100,399	35,468	314,060

NEW CASES.

European	...	394	—	—	394
Asiatics and Africans in Hospitals	...	20,947	11,669	22,772	55,388
African in Sub-Dispensaries	...	14,980	40,331	19,022	74,333
Total	...	36,321	52,000	22,772	130,115

TABLE B.

List of Sub-Dispensaries.

ZANZIBAR DISTRICT.

Name.	New cases.	Attendances.
Central Dispensary (Home Treatment) ...	222	836
School Clinic ...	3,154	5,579
Mkokotoni ...	4,213	8,436
Selem ...	3,350	7,322
Makunduchi ...	5,248	8,252
Mahonda ...	2,297	3,620
Mwera ...	3,729	5,407
Chaani ...	3,720	9,040
Uzini ...	1,884	3,965
Kizimbani ...	3,090	4,583
Bububu ...	1,620	3,559
Bweleo ...	2,007	3,542
Kizimkazi ...	1,629	2,088
Mangapwani ...	922	1,266
Chwaka ...	1,701	4,401
Tunguu ...	1,292	3,022
Mbiji ...	1,069	4,990
Travelling ...	9,236	8,984
Mwembeladu ...	9,680	29,991
Ndijani ...	466	634
Mkwajuni ...	254	610
Muyuni ...	167	672

PEMBA DISTRICT

Mzambaraoni ...	1,760	5,894
Matangatwani ...	2,134	6,375
Kinazini ...	1,575	5,330
Stambuli ...	1,981	1,655
Ole ...	1,972	4,258
Kengeja ...	7,520	23,643
Kangani ...	2,080	4,978

SECTION VII.

REPORT ON PRISONS AND ASYLUMS FOR 1935.

A. PRISONS.

The details relating to each prison are set out in the following table:—

	Daily average in Prison	Daily average on sick list.	Deaths.	Morbidity rate.	Death rate.
Central Prison	... 115.49	17.85	3	154.7	26.9
Wete Prison, Pemba	... 19.1	.2	—	—	—
Chake Chake Prison, Pemba	... 13.41	1.69	—	—	—
Mkoani Prison, Pemba	... 5.08	0.68	—	—	—

Central Prison, Zanzibar.

I. HEALTH OF PRISONERS' DURING THE YEAR 1935.

The health of the prisoners was generally good during the year.

Much benefit has followed the introduction of the new ration scale which came into operation on August 31st and ensures an adequate supply of vitamins and calories. In addition, a small daily dose of cod liver oil was administered to all cases showing signs attributable to lack of vitamins A and D, for example in the eyes, the skin, and mucous membranes. The improved dietary, which includes meat, fish, ghee, fresh fruit and vegetables, has produced a gratifying improvement in general well-being, the good effects naturally being more manifest in long-sentence prisoners.

With a daily average number of prisoners of 115.49, the total admissions for the year being 640, the total number of new cases treated was 781 and repetitions amounted to 5,736. The morbidity rate accordingly stands at 154.7. The daily average on the sick list was 17.85, which is lower than in 1934. Most of the complains were unimportant, being made up of minor injuries, pyrexia, constipation, ulcers, etc., but there were 45 cases of gonorrhœa and 98 of hookworm, and three cases of bacillary dysentery, verified bacteriologically, were treated; one in February and two in May. The following table shows the results of material submitted to the laboratory for examination:—

	+	—	Doubtful.
Kahn Test	... 38	24	10
Blood M.P.	... 12	85	—
Stools for Dysentery	... 3	35	—
Smear for Gonococci	... 8	17	—
Urine for Bilharzia	... 5	2	—
Sputum for T.B.	... 1	19	—
Smear for Leprosy	... —	1	—

Three deaths occurred as against five in 1934. One, whcih took place in the prison infirmary in May, was described as due to dysentery, another was due to cerebral hæmorrhage, and the third supervened in the native hospital after an operation for hernia. The death rate is thus 26.9.

II. PRISON DIETS AND AVITAMINOSIS.

In the Annual Report for 1934, attention was drawn to the fact the prisoners showed signs of vitamin deficiency. These findings were confirmed by Dr. J. P. Mitchell, O.B.E., Medical Superintendent, Mulago, Uganda Protectorate, who visited Zanzibar in August and very kindly undertook a survey of our prisoners. Dr. Mitchell has had a very considerable experience of dietary deficiencies in the Uganda Central Prison and he reported as follows:—

“It was of great interest to me to find evidences of disease similar to those which existed in the Uganda Central Prison prior to the alteration of the diets. In no case were the evidences gross but the incidence over all of border line cases was definitely high. A few cases of xerophthalmia, many cases of powdered nose and cheeks (sulphur flaking) and of gum and tongue pigmentation were seen which combined with dirty eyes, dryness of the skin and the

popular eruption described by Dr. Löewenthal are all manifestations of Vitamin A and probably Vitamin C deficiency."

Before this, in April, Dr. Nicklin had undertaken a detailed survey of the prisoners with the result that of a total number of 86 examined, 34 showed definite signs of avitaminosis. New diets were devised for both Asiatic and Native prisoners and are set out below in comparison with the old diets.

ASIATIC DIETS.

		Average Daily Amounts.	
		Old Scale.	New Scale.
Wheat flour	...	8 ounces	8 ounces
Rice	...	8 "	8 "
Meat, or Fish	...	2 "	—
Meat, lean beef, without bone	...	—	4 "
Curry powder	...	2 drs.	2 drs.
Salt	...	12 "	12 "
Onions	...	4 "	4 "
Dhall	...	4 ounces	4 ounces
Ghee	...	1 "	1 "
Bread	...	8 "	8 "
Coconuts	...	1/10 no.	1/10 no.
Spinach	...	—	2 ounces
Mango, orange, tomato or banana	...	—	1 no.
Lemons	...	2/7 no.	—
Ground nuts, shelled	...	—	2 ounces
Protein in grammes	...	98	123
Fat in grammes	...	53	79
Carbohydrate in grammes	...	512	531
Calorific value	...	2,931	3,332

AFRICAN DIETS.

		Average Daily Amounts.	
		Old Scale.	New Scale.
Rice	...	7 ounces	7 ounces
Mtama	...	14 "	7 "
Maize meal	...	—	7 "
Beans	...	3½ "	3½ "
Fish	...	4 "	—
Meat, lean beef, without bone	...	—	4 "
Curry powder	...	2 drs.	2 drs.
Salt	...	12 "	12 "
Onions	...	2 "	2 "
Chillies	...	1 no.	1 no.
Coconuts	...	1/10 "	1/10 "
Lemons	...	2/7 "	—
Ghee	...	—	1 ounce
Ground nuts, shelled	...	—	2 ounces
Spinach	...	—	2 "
Mango, orange, tomato or banana	...	—	1 no.
Protein in grammes	...	78	114
Fat in grammes	...	35	81
Carbohydrate in grammes	...	513	539
Calorific value	...	2,716	3,353

The new diet scale was introduced on 31st August and in the following March advantage was taken of Dr. Nicklin's presence in Zanzibar for him to undertake a second survey of the prisoners with a view to assessing the effect of the new diet six months after its introduction. The findings of his two surveys are set out below :—

		Native Diet.		Asiatic Diet.		Total.	
		Examined.	No. with Signs.	Examined.	No. with Signs.	Examined.	No. with Signs.
In prison over 1 year	{ April 1935	24	9	4	4	28	13
	{ March 1936	25	3	4	2	29	5
In prison from 6 months to 1 year	{ April 1935	13	7	6	5	19	12
	{ March 1936	27	5	1	0	28	5
In prison for less than 6 months	{ April 1935	36	9	3	0	39	9
	{ March 1936	46	18	7	1	53	19
Total	{ April 1935	73	25	13	9	86	34
	{ March 1936	98	26	12	3	110	29

Whereas before the introduction of the new diet 25 prisoners out of 47 who had been in gaol for six months or over showed signs of avitaminosis, six months after its introduction only 10 out of 57 showed similar signs. Of those 10 Dr. Nicklin reported "Of those still showing symptoms and signs, it must be pointed out the degree was much milder and that former sufferers showed a great improvement as compared with their previous condition.....and the cases must be considered as convalescents.....With regard to the signs and symptoms of Avitaminosis it was found that traces of the condition were still discernible amongst former sufferers. It seems that Xerophthalmia and dimness of vision syndrome is most intractable to treatment by the high vitamin content of the new diet..... The Beri-Beri factor, i.e. "Ganzi" and neuritic pains in the legs appears to have been entirely eliminated." It is hoped that after a longer period of trial, avitaminosis will be abolished in the gaol in so far as prisoners of six months or more are concerned.

The position with regard to prisoners who have been in gaol for less than six months is disquieting, and suggests that avitaminosis amongst the poorer of the free population outside the gaol is increasing with the continuation of the economic depression.

III. SANITATION.

The occurrence of the few cases of Dysentery mentioned led to improved arrangements for the protection of food and more scrupulous cleanliness in the behaviour of prisoners using the latrines. A wire-gauzed food safe was constructed for the kitchen and a strong food-carrying tray, likewise protected against contamination, was supplied for each division in the prison, while the long kitchen table received a smooth easily-cleansable zinc surface. All food-dishes and drinking vessels were ordered to be placed in a disinfectant solution after use.

Each latrine was supplied with a pail of antiseptic solution in which all persons are required to rinse their hands before leaving the latrine.

Water.—A certain amount of intermittency in the water-supply was improved but not entirely remedied by the installation of a second gravitation-tank at Kilimani. There is rarely any real scarcity of water in the prison and the precaution is observed of having large containers ready filled as a reserve, but during a few hours of each day the pressure is insufficient to fill the flushing cisterns, the latrines having then to be flushed from those emergency stores. This matter is in the hands of the Public Works Department.

General.—Ventilation and cubic space per head are adequate and the same high standard of cleanliness of cells, baths and latrines is maintained. Two simple incinerators of the "camp" type have been constructed for the incineration of refuse and are giving more efficient results than the old method of smouldering it in shallow pits.

B. LUNATIC ASYLUM.

1. Details of Admissions, Discharges and Deaths, during 1935 are as follows :—

	Males.	Females.	Total.
Number of Inmates on 31st December, 1934 ...	23	11	34
Admitted during 1935 ...	11	5	16
Discharged during 1935 ...	1	—	1
Died during 1935 ...	3	—	3
Remaining on 31st December, 1935 ...	30	16	46

2. The three deaths were due to Myocardial Degeneration, Mania and Epilepsy respectively.

3. The types of insanity found among the patients are :—

	Males.	Females.	Total.
Mania ...	18	13	31
Melancholia ...	6	1	7
Paranoia ...	1	1	2
Senile Dementia ...	2	1	3
G. P. I. ...	2	—	2
Dementia Praecox ...	1	—	1

The warning in last year's report as to the exercise of reserve in definitely labelling mental disorders in Africans of this class may be recalled, but it seems that a maniacal exaltation with delusions of a grandiose nature is a very frequent form of alienation. The tendency is to the "simple" kinds of aberration; mania, with ideas of power, wealth and physical prowess; melancholia which, however, resembles silent apathy rather than the painful, delusional conviction of hopeless misery seen among more advanced peoples, and is rarely accompanied by refusal of food; senile dementia, representing the wearing-out of a never over-driven mental apparatus and supervening at an earlier age than elsewhere, while the more complicated intellectual derangements such as paranoia and dementia præcox appear to be uncommon.

A confusional state with hallucinations of sight and hearing, and extravagance of behaviour in public, has been noted in several cases referred by the court. This condition appears to arise from privation or virtual starvation, as with a fortnight's ample and regular nutrition and orderly daily life the individual has become quite normal.

The comparatively large number of admissions may to some extent be related, as in other countries, to the prevailing economic stress.

A new and greatly improved dietary scale was introduced at the beginning of the year, and to it must be ascribed in the main the rise in general physical health and energy. Most have gained in weight and there has been an almost complete absence of illness which might be attributed to living conditions. The occasional disorders treated have been mild catarrhal affections, malaria, constipation, light injuries, etc.

Examinations of blood and stools of new cases are carried out as a routine measure. During the year 50% of the admissions showed a positive Kahn reaction, while intestinal parasites were found in 75%. These cases respond well to treatment, the results in the latter group being all the more satisfactory in that, owing to effective sanitary arrangements, the likelihood of re-infection is small and, in fact, later examinations show that the great majority of those effectively treated remain free from parasites.

Occupation and Recreation.—A large number of the female patients share in the preparation of food and general "household" work. They also work at preparing coir, as do some of the men, and all are given some five hours daily outside the building when the weather permits. It is to be regretted that more varied occupation is not practicable in present circumstances.

The unsuitability of the buildings for the purpose of a mental hospital is a recurring observation in these Annual Reports, while at the present time a very few fresh admissions without corresponding discharges will seriously tax the available accommodation.

C. WALEZO INFIRMARY.

POOR ASYLUM WALEZO.

This institution continued to offer a haven of rest and care to the helpless and the destitute under the sage guidance of Sister Friedabertha, while the Out-Patient Dispensary maintained its place in the confidence of the rural population, many of whom come long distances to avail themselves of its services.

Figures for the three divisions in 1935 are:—

(a) *Infirmary.*

	Males.	Females.	Total.
Remaining on 31st December, 1934	... 115	48	163
Admitted during 1935	... 364	90	454
Discharged during 1935	... 238	50	288
Died during 1935	... 122	39	161
Remaining on 31st December, 1935	... 119	49	168

The new out-patients treated during the year numbered 4,155, re-attendances amounted to 16,006 the daily average number of out-patients attending thus being 55.23.

The principal causes of death in the institution were:—

Senile and General Debility.
Paralysis.
Ancylostomiasis.
Tuberculosis.
Pneumonia.
Leprosy.

(b) *Tuberculosis Division.*

	Males.	Females.	Total.
Number on 31st December, 1934	18	—	18
Admitted during 1935	61	5	66
Discharged during 1935 (including 5 males repatriated).	31	2	33
Died	32	3	35
Remaining on 31st December, 1935	16	—	16

Most of the tuberculosis cases are already advanced on admission, and a pathetic feature is that in many instances the delay in seeking treatment is due to the patient's credulity that a cutting operation on his tonsils by the *mganga* will cure the disease whose signs and symptoms are gaining ground. An almost immediate improvement, shown by diminution of fever and cough, and a gain in weight, is a very frequent result of the change to the care and treatment of Walezo, and this sense of amelioration too often, unfortunately, leads the patient to believe that he has conquered his malady and to insist on returning to his former environment, in spite of efforts to dissuade him. The native's carelessness as to propagating infection is notorious, and this consideration, amongst other, has counselled the repatriation, as far as possible, of mainlanders suffering from open Tuberculosis.

The huts have been maintained in good order and the roof of the large dormitory has been renewed.

(c) *Leper Settlement, Walezo.*—

	Males.	Females.	Total.
Remaining on 31st December, 1934	18	11	29
Admitted in 1935	12	6	18
Died in 1935	7	1	8
Remaining on 31st December, 1935	23	16	39

Among the admissions were 11 patients repatriated, to their great content, from Funzi. It is confidently anticipated that when the new settlement (on which work is now progressing) on a more spacious site in the close vicinity of Walezo, is ready, sufferers will come forward voluntarily to share in its advantages, and in this way there is ground for hope that the real crux of the problem here, viz, the protection of the child and the treatment of the earliest cases, will gradually come under control.

It will be noticed that no "Discharges" appear among the figures given, and none need be expected in the immediate future, because it must be regretfully recognized that, so far, the leper who comes under care and treatment is invariably an advanced and long-standing case. In the meantime, modern therapeutic preparations are employed at Walezo combined with other measures designed to enhance the patients' resistance and generally improve his well-being. Not the least of these adjuvants is the sense of good-will and cheerfulness which palpably pervades the settlement.

D. FUNZI ISLAND LEPER SETTLEMENT.

The following table shows the movement of the Leper population during 1935:—

	Males.	Females.	Total.
Number of lepers in the Asylum on 1st January, 1935	69	22	91
Number of new cases admitted during 1935	1	2	3
Number of lepers re-admitted during 1935	—	—	—
Number of deaths in Asylum during 1935	6	—	6
Number paroled from Asylum to Walezo	5	5	10
Number paroled from Asylum to Homes	27	—	27
Number remaining in Asylum on 31st December, 1935	32	19	51

It will be seen that the total number of inmates has decreased considerably since the beginning of the year. This is accounted for by the repatriation of lepers hailing from Zanzibar and the Mainland to their respective home countries; the transfer of others to Walezo, and the parole of burnt out cases.

Plans were formulated during the year for the transfer of the Funzi Settlement to a more convenient and suitable situation in the Wete district of Pemba, and it is hoped that these plans will come into operation during 1936. For several reasons it has been found that Funzi Island is unsuitable for lepers. It is hot and arid, and the sharp coral rag predisposes the patients to ulceration of the feet. The buildings are also unsatisfactory and it is hoped to construct the new settlement on lines more in accordance with modern principles and in more homely surroundings. By the establishment of a less remote centre for treatment, it is hoped that leprotic subjects will be less chary of concealing their disease and that in consequence treatment will be possible at the earliest stages for a larger number of patients.

Treatment in the main has consisted in palliative measures directed towards the healing of leprotic lesions and the provision of a diet calculated to raise their general resistance to disease. Thirty-five however have received courses of Alepol injections during the year. All the lepers were provided with shoes during the year, in order to combat the undue prevalence of trophic ulcers of the feet.

Before completing this report mention must be made of the excellent work and devotion of Miss Lowndes, Miss Rutter, Miss Phillips and Miss Hay Wilson. These ladies have done much to alleviate the sufferings of the lepers.

SECTION VIII.

METEOROLOGY.

All available information is printed in the Blue Book for the Protectorate.

SECTION IX.

(A) ANNUAL REPORT OF THE PATHOLOGICAL LABORATORY.

1. ZANZIBAR.

Staff.—The Pathologist was in charge throughout the year, and there was no change in staff except as under. Early in the year a young qualified school-master, an Arab, for whom no vacancy existed in the Education Department, was employed in the hope that he might be trained in the more highly skilled branches of laboratory work. He proved to be unsuitable, and left at the end of the year.

A post to be filled by a Learner has been recommended for 1936, for which it is expected a suitable candidate will be found.

Building and Equipment.—During the heavy rains in May large portions of the wall of the building, in which are the sterilizing room and store, began to fall, and urgent repairs became necessary. These were carried out, and the leaky roof was waterproofed in a permanent manner, adding greatly to the amenities.

The installation of the high-pressure water system in the town has proved to be a great convenience to the laboratory.

The laboratory of the Government Chemist was moved to the far end of the building in which the Pathological laboratory is situated this year, being mutually advantageous, both for consultation and in enabling a common petrol gas plant to be shared. This plant was ordered during the year, and will be installed early in 1936.

The Ultra-violet light apparatus, formerly in charge of the Government Chemist, was removed to the dark-room in the Pathologist's private office, where it could be more conveniently used for medico-legal examinations, and at the same time is readily available to the Government Chemist.

General Remarks.—On April 1st a schedule of charges for all work undertaken in the laboratory for private medical practitioners came into force, on which day also a charge was instituted at the Government Hospitals for all patients receiving attention. These latter charges made little or no difference to the amount of work received from the Native Hospital, Zanzibar, from which, as formerly, the bulk of material examined was derived.

As regards private practitioners, the effect of charging for certain examinations which formerly were free was to eliminate them almost completely, and to substitute requests for more important pathological examinations having a greater value to the clinician. The revenue derived from these charges was Rs. 256-50.

The total number of examinations carried out in the laboratory during the year was 15,429, an increase of 1,532 over the total for 1934. This increase was spread over several sections of work, being most noticeable in the numbers of Kahn tests, fæces examinations and slides for diagnosis of gonorrhœ.

Fewer specimens were received from Pemba this year.

Owing to pressure of routine work, it was found to be impossible to carry out systematic research work, though a beginning was made with the investigation of the normal blood of African Natives.

The thanks of the Pathologist are due to Dr. Vint of the Medical Research Laboratory, Nairobi, for his assistance in giving an opinion on three difficult histological sections.

The work of the laboratory is reported under the following headings:—

- | | |
|-------------------------------|---------------------------|
| A. Parasitology | F. Public Health |
| B. Serology | G. Histology |
| C. Bacteriology | H. Autopsies |
| D. Biochemistry | I. Medico-legal |
| E. General Clinical Pathology | J. Special Investigation. |

(A) PARASITOLOGY.

(1) BLOOD FILMS.

Malaria.—A total of 6,932 films was submitted for examination, of which 21.5 per cent were positive, in comparison with 33.0 per cent positive in a slightly larger number of films in 1934.

Crescents were found in seven cases only out of 592 positive subtertian films.

Quartan parasites occurred in only nine cases.

The thick drop method was used in every case for the primary recognition of parasites, which frequently were very scanty and distorted by this method, and therefore, as in previous years, a considerable number of parasites were recognized as such, but could not be referred positively to a definite species, and were therefore classed as “type undefined”, since a search of the thin film failed to reveal parasites on which a definite diagnosis might have been made.

Microfilaria.—In the course of examination of slides for malaria 55 microfilaria bancrofti were found, as against 51 in 1934 in a slightly larger series of slides.

(2) FÆCES.

There was a substantial increase in the number of specimens received for examination this year, the total number 3,444, being 1,394 more than last year.

Of the helminthic ova, ancylostomes predominated, but the percentage of positive findings for ancylostomes, 47.8 per cent, was not as high in 1934 when 53.4 per cent were positive, in spite of examination of all stools which did not show ancylostome ova in a direct smear by a concentration method throughout 1935.

One schistosoma mansoni infection was recorded, but this species of worm does not occur in Zanzibar, and the infection must have been acquired on the mainland.

Protozoal infestations are also uncommon in Zanzibar, only 11 of which three were entamoeba histolytica, being found in 43 stools examined for protozoa.

(3) URINE.

Schistosoma hæmatobium infestations are common in Zanzibar, and of the 183 specimens of urine submitted for examination for the presence of ova of this parasite, no less than 113, or 61.7 per cent, were positive.

(B) SEROLOGY.

(1) SYPHILIS AND YAWS.

The Kahn test was used throughout the year, employing “Difco” brand antigen, since it was found that the difficulty of preparing a satisfactory antigen from the local ox hearts, which appear to be deficient in lipoids, was such as to make it preferable to use this standard antigen.

The total number of Kahn tests carried out on blood sera was 1,493, of which 33.4 per cent were positive. In addition, two cerebro-spinal fluids were tested and both were negative.

The Medical Officers in Pemba forwarded a certain number of sera for diagnosis, thus:—

From Chake Chake	65 sera, of which 26 were positive.
From Mkoani	2 sera, of which 1 was positive.
From Wete	1 serum, which was positive.

Further blood tests on the general population were carried out in continuance of last year's work, as follows:—

Adult natives at Mkokotoni	10 sera gave	1 positive or	10.0%
School boys	12 „ „	1 „ „	8.3%
Asylum, Zanzibar	18 „ „	8 „ „	44.4%
Central Prison, Zanzibar	64 „ „	37 „ „	57.8%
Police, Zanzibar	321 „ „	105 „ „	32.7%

Thus the percentage incidence in sera from the Asylum and Prison was higher than in those examined last year. The combined results of 1934 and 1935 tests of the above groups are :—

School boys	114	sera gave	8	positive or	7.0%
Asylum	45		16		35.5%
Prison	137		65		47.4%
Police	337		109		32.3%

Since all the subjects of the above tests have been exposed to yaws infection, it is impossible to say what proportion of positives is due to yaws and syphilis respectively, but the great difference between the school boy group and the adult groups may prove to be significant when larger number of tests have done.

(2) ENTERIC GROUP.

The agglutination test, using Dreyer's technique and suspensions from the Standards Laboratory, Oxford, was carried out in 106 cases, divided into those undertaken for diagnostic purposes, and those done in connexion with a special investigation for typhoid carriers.

In the first group, out of 33 cases, 25 were positive within diagnostic limits for *Bacterium typhosum*. The actual number of tests made exceeded 33, as in many cases one or more subsequent tests were necessary to ascertain if the titre of the serum was rising, since only too frequently laboratory assistance in diagnosis was called for when it was too late for blood cultures to be taken.

The special investigation into the "Carrier" question is detailed under Heading (J).

In all cases (H) and (O) agglutinations were titrated, and where (O) agglutinations were present a further agglutination of the serum against a Specific (H) Suspension of *Bact. enteritidis* Gærtner was done. From this latter work some interesting results emerged, namely, that in four persons clinically and serologically diagnosed as typhoid fever, agglutinations for *Bact. enteritidis* Gærtner (H) in specific phase were also present in a titre of 1 in 125 in three cases, and 1 in 250 in one case; and in five apparently healthy persons examined as contacts or possible carriers, two sera gave a titre to *Bact. Gærtner* in dilutions of 1 in 50, one serum at 1 in 125, and two sera at 1 in 250.

During the three previous years serological evidence had begun to appear that *Bact. enteritidis* Gærtner must exist in the bazaars, although no cases of food-poisoning have been reported. The further evidence of this in the nine cases reported above, which include Cingalese, Hindus, Mohammedan Indians and one African Native, is of interest, and will be followed up as opportunity permits.

(C) BACTERIOLOGY.

(1) BLOOD.

Of 15 blood cultures, pathogenic organisms were isolated from 4, all being *Bacterium typhosum*.

(2) FÆCES.

Cultures were made of the fæces of 152 cases of suspected dysentery, resulting in the isolation of the following dysentery bacilli :—

Bact. dysenteriae,	Shiga	...	3
"	Flexner	...	26
"	Sonne	...	9

Each Flexner strain isolated was typed, giving the following mixtures of types :—

X, VX, XY, XZ, VXZ, XYZ, with varying proportions of the components in the different strains. It is of interest to note that the first 13 strains were XYZ types, the remaining strains being VXZ types.

The first VXZ case occurred in a European child, probably infected from the Goan cook: later, a native servant in this household contracted dysentery, which proved to be due to B. Flexner of the same strain, with the same relative

proportions of the different types, indicating that no change had taken place during human passage.

From the stool of a patient in the Native Hospital, Zanzibar, both B. Shiga and B. Flexner were isolated (XYZ strain).

In previous years the Central Prison, Zanzibar, provided most of the positive cases of Bacillary dysentery, though since the installation of flushing water closets the incidence has diminished. This year out of stools of 23 cases submitted from the Prison for examination for bacillary dysentery (some of them several times) only four were positive, one being Flexner type and three Sonne type.

These cases occurred in May and June, and were associated with the presence in the cook house of a prisoner who was found to have had dysentery in Pemba shortly before his reception in the Central Prison. This man's stools were abnormal, but no dysentery organisms were isolated: nevertheless, with his removal from the cook house cases ceased to occur. The stools of three other cooks were also cultured, but were normal. That transference of infection was not entirely from the presence of the above-mentioned prisoner in the kitchen is shown by the occurrence of a case of bacillary dysentery during the same period in a child, a member of the family of the Jail Clerk, whose house is adjacent to the Prison. This must have been acquired by fly transmission, for the stools of the rest of the family were normal on examination.

Bacterium typhosum was cultured from one stool only out of 22, mostly stools of patients convalescing from typhoid fever examined before discharge from hospital.

(3) URINE.

Fourteen catheter specimens were submitted for culture for coliform and other organisms, and six from convalescing typhoid cases, all the latter being negative.

(4) SPUTUM.

The number of sputa received for examination for M. tuberculosis was 530, being 201 fewer than in 1934. The percentage of positive findings was 29.8% compared with 35.1% in 1934. The reduction in the number of specimens received and the above results are attributed to the fact that during the greater part of 1934 the Tuberculosis Clinic was in the hands of a Medical Officer specially selected for the work and who gave his whole time to it, whereas in 1935 the Medical Officer in charge had other duties in addition to this clinic.

The one culture of *Pneumococcus* isolated from four sputa from the Native Hospital, none of which were typical pneumonia sputa, was sent to Nairobi to be typed but was found to be dead on arrival.

It is of importance that the local strains of *Pneumococcus* should be typed, and further endeavours will be made to obtain suitable sputa from the hospital.

Three sputa from cases of asthma were cultured for preparation of vaccine.

(5) THROAT SWABS.

At the beginning of the year there was an outbreak of diphtheria among children of the Indian and Goan communities in Zanzibar Town, though no connexion between the two groups could be traced.

The incidence among Indians was limited to three fatal cases: swabs from 19 contacts were negative on culture.

Among the Goans, three children attending the same school had clinical diphtheria. Four contacts of these patients out of 37 examined were found to be harbouring *C. diphtheriæ* in the throat. Accordingly, throat swabs were taken from all the children at that school, a total of 91 children being examined, with the result that one carrier was found. After her isolation, the outbreak ceased.

In addition to work in connexion with the above outbreak, a number of other throat swabs were examined but were negative.

Altogether 187 throat swabs were examined.

(6) Pus.

No comments are called for.

(7) SMEARS FOR GONOCOCCUS.

There was a very considerable increase of urethral smears for diagnosis of gonorrhœa this year, 498 being received, an increase of 342 over last year's total of 156.

Only one conjunctival smear was submitted, and no cervical smears.

(8) SMEARS FOR M. LEPRÆ.

Of 32 nasal smears and skin smears, 14 were positive.

(9) PATHOLOGICAL FLUIDS.

(10) SKIN SCRAPING FOR FUNGUS.

There is nothing of interest to record in regard to the above.

(11) VACCINES.

In parallel with the unusual number of gonorrhœal slides received, there was a great demand by the medical staff for the gonococcus vaccine prepared in the laboratory from local strains, and which was found to give most satisfactory results in treatment. During the year 1,205 c.c. were prepared, an increase of 843 c.c. over the amount prepared in 1934.

Seven mixed vaccines were prepared for other conditions, few demands for vaccines of secondary organisms from cases of pulmonary tuberculosis being made this year.

(12) YEAST SUSPENSION.

The preparation of this product was discontinued early in February, as it was no longer required, 1550 c.c. having been made since the beginning of the year.

(D) BIOCHEMISTRY.

Blood Sugar Estimations.—The total 333 showed a decrease by 145 compared with last year. This was due to the estimations on 12 diabetic patients being required only monthly instead of weekly as previously.

Other biochemical investigations call for no special comment.

(E) GENERAL CLINICAL PATHOLOGY.

Examination of the four cerebro-spinal fluids submitted included cytology and general chemical characters.

In the sputum of a case of asthma a Curschmann's Spiral was found, an event of some interest in view of the rarity of these bodies.

(F) PUBLIC HEALTH.

No samples of sewage were submitted this year, but 15 of milk were received from the Medical Officer of Health. These were examined as three groups, viz. :—

- I. Samples collected from three country dairies taking special precautions as to cleanliness, and which gave Colony counts on agar in 24 hours at 37° C. of 600,900 and 75,400 per c.c. respectively, and presumptive B. coli test in over 0.1 c.c. in each case.
- II. Other country milks collected without special care, which gave colony counts ranging from 235,000 to 9,500,000 per c.c., and presumptive B. coli in over 0.1 c.c. to 0.00001 c.c.
- III. Milk from the Government Dairy, Mji Mpia, giving colony counts ranging from 10,100 to 7,700,000 per c.c., with presumptive B. coli in over 0.1 c.c. to 0.00001 c.c.

The results obtained suggest that with proper attention to cleanliness an enormous improvement of the quality of the milk can be effected.

Water.—The total number of water samples examined was 158.

Regular monthly examinations of Zanzibar Town Water supplies were made, samples being collected at the springs and from taps in the Town, the quality invariably being satisfactory.

The installation of the high-pressure system in March involved storage to some extent of water in the open main tank of the water-works, resulting in some growth of green algæ. The tank was at once closed in, after which the growth ceased.

Samples were taken from selected domestic tanks to ensure that no deterioration of bacterial quality took place during storage in these tanks: comparison between samples taken directly after introduction of the high pressure system and five months later showed a definite improvement in this respect.

A special examination and report was made on a spring and a well under consideration as water supplies for the new school at Dole.

Water from six wells in Zanzibar Town was examined at the request of the Medical Officer of Health, and the well at Chukwani was also the subject of a report.

The water of the well supplying Mkoani Township, Pemba was found to have excretal *B. coli* in 0.1 c.c. Further samples taken two months later gave an identical result, and therefore chemical analysis of this water was made in the Chemical Laboratory. This established that the pollution was from vegetable, not animal sources.

Unchlorinated water from the Chake Chake Township supply in Pemba gave no bacterial indication of pollution.

The water supply at Wete, Pemba, was also examined and was found to be free from pollution.

It may be of interest to record the method adopted for collection of water samples from Pemba.

The necessary pipettes, sterilized in a metal cases, and the tubes of measured volumes of liquid MacConkey's medium, are sent, through the courtesy of the Port Officer, in charge of the Chief Officer of the Government steamer, and are received by a messenger instructed to keep the tubes upright. The Medical Officer requiring the examination himself inoculates the culture tubes with water taken direct from the source of supply to be tested, and sends them back by the return steamer, the inoculation having as a rule been made barely 24 hours before the tubes are received back in the laboratory. Thus there is a period of incubation at air temperature (about 27° C.) before the tubes reach the incubator at 37° C., and though this is not ideal, it is considered to be far more satisfactory than sending samples of water which for lack of facilities cannot be packed in ice.

Rats.—Spleen smears made regularly from each batch of rats caught, but no evidence of plague was found in 870 smears examined.

(G) HISTOLOGY.

Of the 21 tissues received for section and diagnosis four were sent by the Medical Officer, Chake Chake, Pemba.

Three sections were sent to Dr. Vint, Nairobi, for his opinion.

Ten malignant tumours were diagnosed, two of which were sarcomata and the remainder carcinomata. One of the sarcomata was a chondro-sarcoma and in Dr. Vint's opinion is relatively benign.

The track of a "larva migrans" was excised and sent for section, but the larva was not found, and subsequently proved still to be in the patient's skin.

(H) AUTOPSIES.

Without exception, the 11 autopsies were done at the request of the Police. Four were on the victims of motor car accidents, and two were cases of homicide. Among the other cases was one of suspected poisoning in an African, the body

showing jaundice and signs of the action of a toxin, with great congestion of the kidneys. Before death there was marked hæmoglobinuria. Microscopical sections of tissues showed cellular degeneration, the secretory tubules of the kidneys especially being severely damaged. Chemical examination of the stomach and its contents by the Government Analyst failed to show the presence of poison.

(I) MEDICO-LEGAL.

Many more of these examinations were required this year than previously. Seventeen cases were undertaken, entailing the examination of 32 articles: no less than ten of these cases were for detection of seminal stains in cases of suspected rape, while two were in connexion with charges of bestiality, and the remaining five were for identification of human blood stains. In addition to these investigations, a human finger found by the Police in connexion with a case was sent for preservation, and subsequently was used in Court proceedings.

(J) SPECIAL INVESTIGATIONS.

1. Work in connexion with the search for a typhoid carrier in the region of the Post Office, Zanzibar Town, commencement of which was recorded in last year's Annual Report, was resumed this year.

Personal inspection of houses in this area, which were under suspicion, was made with the Medical Officer of Health, and blood was collected from 21 persons for agglutination against suspensions of *Bacterium typhosum*.

Positive reactions were obtained in nine cases, none of the individuals having ever had previous anti-typhoid inoculation, but only three reacted at titres over 1 in 50. Of these, two had a titre of 1 in 125, and the third had (H) agglutinins in a dilution of 1 in 1450.

A fresh stool of each person having a positive blood reaction to *Bact. typhosum* was cultured, both normal stools, and the evacuations resulting from a dose of magnesium sulphate on rising in the morning. All cultures were negative with one exception, that of the individual whose blood serum agglutinated *Bact. typhosum* (H) at 1 in 1450, from whose stools *Bacterium typhosum* was isolated. On each of the plate cultures made from the stools of this man some 70 to 100 colonies of *Bacterium typhosum* were counted, and normal stools subsequently taken from him at random never failed to give colonies of this organism in great numbers. Urine cultures were consistently negative.

This man was evidently a carrier, and doubtless was responsible for the numerous cases which have occurred during the past few years in the neighbourhood of his house.

He has been treated with massive doses of Hexamine and alkali without any change in the number of Typhoid bacilli in the stools. Other treatment involving injections he has refused, and therefore prophylaxis has had to be confined to explanation of his condition as a source of danger to others, instruction regarding cleanliness of hands and of his latrine and use of disinfectants, with special reference to the part played by flies in the dissemination of typhoid fever. Fortunately, he is tractable and has carried out instructions; and though cure of the carrier condition seems to be unlikely, it is of considerable value to have identified the source of typhoid fever in that quarter of the Town, and thus to be in a position to control it.

2. In a different part of the Town, cases of typhoid fever have been noted to occur sporadically during the past four years.

In 1935 there was a striking increase of cases in this quarter, four being diagnosed in the laboratory in March and April, and 11 between August and December, of these latter no less than five being in one house.

A personal inspection of the neighbourhood was made with the Medical Officer of Health and his staff, and all the houses where cases had occurred were visited.

From this it seemed clear that at least two foci of infection existed, and that the distribution was by flies from carriers, one focus being among Hindus, the other among Mahomedan Indians (Ithnasheri Khoja).

Blood was collected for the agglutination test from all the inhabitants of the houses, except very young children, 32 sera being examined: but no evidence pointing to a carrier was obtained.

Among the Muslim group, the head of one family admitted having an illness resembling typhoid fever in Bombay the previous year, and his blood agglutinated up to 1 in 125 (H agglutinins only), but culture of his stools and urine was negative on two occasions. At this stage the investigation had to be put aside owing to pressure of other work and difficulty in obtaining fresh stools from this individual, but it will be resumed when opportunity arises.

It is of interest to note that in the sera of the Hindus and Muslims examined *Bacterium typhosum* (O) agglutinins were present in a high proportion of cases (16 out of 32), and that on further investigation of the agglutinins, one serum was found to agglutinate *Bact. enteritidis* Gærtner (H) in specific phase at 1 in 250 dilution.

Reference to the Gærtner agglutination of sera during these investigations has already been made under Section B. (2).

A. PARASITOLOGY.

BLOOD.—		Positive.	Negative.	Total.
Malaria	<i>P. Vivax</i>	341	5,015	6,392
	<i>P. Falciparum</i>	592		
	<i>P. malariae</i>	9		
	Undefined plasmodia	435		
Microfilaria		55		55
				6,447
.				
FÆCES.—				
Ancylostoma		1,620		3,389
Ascaris		105		
Schistosoma		1		
Strongyloides		303		
Trichuris		458		
Ancylostoma ova count				12
Giardia intestinalis		3	32	43
Entamoeba histolytica		3		
„ coli		3		
„ unidentified		2		
				3,444
URINE.—				
Schistosoma hematobium		113	70	183

B. SEROLOGY.

Kahn's test	499	994	1,493
Agglutination tests—			
Bact. typhosum	251	72	106
Salmonella group	9		
			1,599

C. BACTERIOLOGY.

Blood Cultures.	Bact. typhosum	4	11	15
FÆCES—				
B. dysenteriae—	Flexner	26	114	152
	Shiga	3		
	Sonne	9		
Bact. typhosum		1	21	22
URINE.—				
Culture for Bact. typhosum				6
" " other organisms				14
				209

	Positive.	Negative.	Total.
SPUTUM.—			
B. tuberculosis in films	158	371	529
„ „ by concentration		1	1
Culture for general examination			3
„ „ Pneumococci	1	3	4
			537
THROAT SWABS.—			
C. diphtheriæ	16	170	186
Vincent's organisms	1		1
PUS.—			
Gonococci (Urethral and Prostrate smears)	193	305	498
„ (Eye smears)		1	1
From Gums for general examination			1
Cultural examination			11
			511
Nasal and skin smears for M. lepræ	14	18	32
Scraping from finger for Fungus		1	1
VACCINES.—			
Mixed			7 c.c.
Gonococci			1,205 c.c.
Yeast suspension			1,550 c.c.
PATHOLOGICAL FLUIDS.—			
Chancre juice for Spirochæta pallida	1	8	9
Pleural			2
			11

D. BIOCHEMISTRY.

Blood sugar estimation	333
Blood urea estimation	41
Blood calcium and phosphate estimation	1
Van den Bergh's reaction	5
Fractional test meals	5
Quantitative estimation of albumen in urine	3
Quantitative estimation of urea in urine	41
Presence of sugar in urine	305
„ „ Ketone bodies	6
„ „ Indican	2
Diastase Index in urine	1
Occult Blood	3
	746

E. GENERAL AND CLINICAL PATHOLOGY.

BLOOD.—	
Red cell count and colour index	96
Leucocyte count	33
„ and Differential count	2
Complete blood count	2
Differential count	5
Blood grouping	1
C.S.F. for General examination	4
URINE.—	
General examination	2
Examination of deposits only	332
SPUTUM.—	
Curschmann's spirals	1
	478

F. PUBLIC HEALTH.

Sewage	—
Milk	15
Water	158
Rats	870
	1,043

G. HISTOLOGY.

General: Normal prostrate gland	1
Normal connective and muscular tissue	1
Track of "larva migrans" in skin	1
Blood clot from aneurysm	1
Chronic inflammation of lymph glands	1
Congestive hyperplasia of uterus	1
Tuberculosis of lymph gland	2
Benign Tumours:	
Sebaceous cyst of face	1
Teratoma of abdominal wall	1
Adenoma of thyroid gland	1
Malignant Tumours:	
Chondro sarcoma of foot	1
Round-celled sarcoma of frontal bone	1
Adeno-carcinoma	1
Adeno-carcinoma of rectum	1
Squamous-celled carcinoma of skin	2
Squamous-celled carcinoma of œsophagus	1
Scirrhous carcinoma of breast	1
Spheroidal-celled carcinoma of liver	1
Transitional carcinoma of bladder	1
	21

H. AUTOSPSIES.

Injuries received from motor car	4
Acute hæmolysis	1
Natural causes	3
Drowning	1
Homicide by gunshot wound	1
Homicide by stabbing	1
	11

I. MEDICO-LEGAL.

Clothing for seminal stains and blood	3
Clothing for seminal stains only	7
Clothing and knives for blood stains	5
Swab for Gonococci and Spermatozoa	1
Swab for Spermatozoa	1
	17

J. SPECIAL INVESTIGATION.

2. CHAKE CHAKE.

The following is a summary of the examination made and findings in Chake Chake Laboratory :—

No. of Blood Examinations, each containing a thick and thin film		= 1028
No. of these showing no parasites	= 562	
.. .. . P. vivax and falciparum	= 5	
.. .. . P. vivax only	= 64	
.. .. . P. falciparum only	= 313	
.. .. . Undefined plasmodia	= 70	
.. .. . Microfilaria	= 14	
No. of Urine Examinations		= 847
No. of these showing albumen	= 114	
.. .. . Schistosoma eggs	= 106	
.. .. . Bile salts	= —	
.. .. . Sugar	= 9	

No. of Fæces Examinations	= 1183
No. of these showing Ancylostome eggs	= 463
.. .. . Ascaris eggs	= 73
.. .. . Trichuris eggs	= 184
.. .. . Multiple infestation	= 84
No. of Sputum Examinations	= 43
No. of these in which acid fast organisms were observed	= 17
No. of Smears of various material examined	= 41
No. of times Gonococci observed	= 7
No. of Examinations for M. lepræ	= 15
No. of times M. lepræ were observed	= 5
Total number of Examinations	= 3157

Sixty-five bloods for Kahn's test and a few tissues for sectioning were sent to the Pathologist at Zanzibar.

3. MKOANI.

The following is a summary of the examinations made and findings in Mkoani Laboratory :—

No. of Blood Examinations, each containing a thick and thin film	= 69
No. of these showing no parasites	= 46
.. .. . P. vivax and falciparum	= 0
.. .. . P. vivax only	= 3
.. .. . P. falciparum only	= 16
.. .. . Undefined plasmodia	= 3
.. .. . Microfilaria	= 1
No. of Urine Examinations	= 158
No. of these showing albumen	= 18
.. .. . Schistosoma eggs	= 79
.. .. . Bile salts	= —
.. .. . Sugar	= —
No. of Fæces Examinations	= 116
No. of these showing Ancylostome eggs	= 62
.. .. . Ascaris eggs	= 15
.. .. . Trichuris eggs	= 19
.. .. . Multiple infestation	= —
No. of Sputum Examinations	= 9
No. of these in which acid fast organisms were observed	= 4
No. of Examinations for M. lepræ	= 5
No. of times M. lepræ were observed	= 1
Total number of Examinations	= 357

A few bloods and a few tissues for sectioning have been sent to the Pathologist.

4. WETE.

Blood Examination.		Urine.		Skin and Nasal Smear.		Sputum for Tuberculosis.		Fæces.	
Total—160.		Total—110.		for M. lepræ 30.		Total—62.		Total—81.	
Plasmodium vivax	33	Schistosoma	16	Positive	10	Positive	20	Ancylostoma	30
.. falciparum	17	Routine	94	Negative	20	Negative	42	Other Examination	51
Undefined plasmodia	35								
Negative	75								
Microfilaria	10								

NOTE :—"Repeat" Examinations of Urine and Fæces are not counted in the totals.

(B) SCIENTIFIC.

Scientific papers published during the year 1935 by members of the Medical Staff:—

Dr. W. Harden Smith :

Native Diet in Zanzibar.—The East African Medical Journal, Vol. XI, No. 8.

TABLE I.
SANCTIONED ESTABLISHMENT, 1935.

The establishment for 1935, as sanctioned in the Estimates, was as follows:—

ADMINISTRATION DIVISION.	
Director of Medical Services.	11 Clerks.
SPECIAL APPOINTMENTS.	
1 Senior Specialist Officer.	1 Dental Surgeon.
MEDICAL DIVISION—GENERAL.	
1 Senior Medical Officer.	1 Instructor Native Dispensers.
8 Medical Officers.	3 Asiatic Dispensers.
7 Sub-Assistant Surgeons.	1 Asiatic Cook.
2 Senior Native Medical Assistants.	
NURSING STAFF.	
1 Matron.	10 Nursing Sisters.
SANITATION DIVISION.	
1 Sanitary Superintendent.	3 Asiatic Sanitary Inspectors.
LABORATORY.	
1 Pathologist.	1 Senior Laboratory Assistant (Asiatic).
1 Laboratory Assistant (Asiatic).	

TABLE II.
FINANCIAL.

	1935. £
A. EXPENDITURE—MEDICAL DEPARTMENT.	
Personal Emoluments	... 24,791
Other Charges:—	
General Stores	... 1,115
Drugs and Surgical Requisites	... 2,552
Subsistence of Hospital Patients	... 1,735
Passages	... 1,000
Sanitation Labour	... 1,519
Maintenance of Lepers	... 495
Tuberculosis Treatment, Maintenance of Clinic and Patients	... 320
Miscellaneous Services	... 3,048
	36,575
B. EXPENDITURE—MUNICIPALITY.	
Personal Emoluments	... 2,990
Other Charges:—	
Equipment and Stores, Sanitation	... 281
Sanitation Labour	... 3,842
	7,113
C. GRANTS-IN-AID.	
Roman Catholic Mission for Maintenance of Pauper Hospital	... 1,154
Zanzibar Maternity Association	... 562
	1,716
D. REVENUE.	
Hospital Fees, Sale of Drugs, etc.	... 1,518
Contributions from other dependencies towards the Quarantine services	... 2,475

TABLE III.
RETURN OF STATISTICS OF POPULATION.

All the information available is in the Protectorate Blue Book.

TABLE IV.
METEOROLOGICAL RETURN.

The following is a brief summary of the more important meteorological returns available for the year, compared with the means for the years 1892-1934 in the case of Zanzibar and the mean for the year 1899-1934 in the case of Pemba.

	Zanzibar (town)		Pemba (Wesha)	
	1892-1934	1935.	1899-1934	1935.
	F	F	F	F
Mean of daily maxima ...	84.4	83.8	86.3	85.9
,, ,, ,, minima ...	76.6	76.8	75.9	73.1
,, ,, ,, range ...	7.8	7.0	10.4	12.8
Mean ...	80.5	80.3	81.1	79.5
Rainfall (inches) ...	58.79	111.89	72.9	75.88
Rainy days ...	104	121	161	174

TABLES V AND VI.

Return of Diseases and Deaths for the Year 1935.

DISEASES	TABLE V					TABLE VI
	Remaining in Hospital at end of 1933	Yearly Admissions	Total Cases Treated	Total Deaths	Remaining in Hospital at end of 1934	All Cases including both In- and Out- Patients
I. EPIDEMIC, ENDEMIC AND INFECTIOUS DISEASES.						
1. Enteric Group—						
(a) Typhoid Fever ...	1	4	5	1	1	4
(b) Paratyphoid A ...	...	...	...	...	...	...
(c) Paratyphoid B ...	...	...	...	...	...	...
(d) Type not defined ...	...	...	...	...	...	...
2. Typhus ...	...	...	...	...	...	...
3. Relapsing Fever ...	...	...	...	...	...	...
4. Undulant Fever ...	...	...	...	...	...	...
5. Malaria—						
(a) Tertian ...	1	30	31	...	3	566
(b) Quartan ...	...	2	2	...	...	7
(c) Æstivo-autumnal ...	2	80	82	9	...	627
(d) Clinical ...	...	53	53	...	...	5,175
(e) Mixed Infections ...	...	...	...	...	...	...
(f) Cachexia ...	...	17	17	...	1	523
(g) Blackwater ...	...	4	4	...	...	4
6. Smallpox ...	...	...	...	...	...	...
Alastrim ...	...	...	...	...	...	...
7. Measles ...	...	8	8	...	1	98
8. Scarlet Fever ...	...	...	...	...	...	...
9. Whooping Cough ...	...	2	2	...	...	134
10. Diphtheria ...	...	2	2	1	...	3
11. Influenza ...	2	38	40	...	1	793
12. Miliary Fever ...	...	...	...	...	...	...
13. Mumps ...	...	...	...	...	...	27
14. Cholera ...	...	...	...	...	...	...
15. Epidemic Diarrhoea ...	...	...	...	...	...	...
16. Dysentery—						
(a) Amœbic ...	...	2	2	...	1	18
(b) Bacillary ...	1	29	30	3	3	37
(c) Undefined or due to other causes ...	...	2	2	1	1	5
17. Plague—						
(a) Bubonic ...	...	...	...	...	...	...
(b) Pneumonic... ..	...	...	...	...	...	...
(c) Septicæmic ...	...	...	...	...	...	...
(d) Undefined ...	...	...	...	...	...	...
18. Yellow Fever ...	...	...	...	...	...	...
19. Spirochaetosis ictero-hæmorrhagica ...	...	...	...	...	...	...
20. Leprosy ...	29	23	52	8	40	39
21. Erysipelas ...	...	...	...	...	...	...
22. Acute Poliomyelitis ...	...	...	...	...	...	...
23. Encephalitis Lethargica ...	...	...	...	...	...	...
24. Epidemic Cerebro-Spinal Fever ...	...	...	...	...	...	...
25. Other Epidemic Diseases—						
(a) Rubeola (German Measles) ...	...	...	...	...	...	16
(b) Varicella (Chicken-pox) ...	...	18	18	...	...	55
(c) Kala-azar ...	...	...	...	...	...	...
(d) Phlebotomus Fever ...	...	...	...	...	...	...
(e) Dengue ...	...	...	...	...	...	...
(f) Epidemic Dropsy ...	...	...	...	...	...	...
(g) Yaws ...	1	15	16	...	1	4,192
(h) Trypanosomiasis ...	...	...	...	...	...	...
(i) P.U.O. ...	...	...	...	...	...	...
26. Glanders ...	...	...	...	...	...	...
27. Anthrax ...	...	...	...	...	...	...
28. Rabies ...	...	...	...	...	...	...
29. Tetanus ...	...	5	5	2	...	6
30. Mycosis ...	...	...	...	...	...	...
31. Tuberculosis, Pulmonary and Laryngeal ...	25	132	157	50	19	181
32. Tuberculosis of the Meninges or Central Nervous System ...	...	...	...	...	...	...
33. Tuberculosis of the Intestines or Peritoneum ...	...	2	2	1	...	4
34. Tuberculosis of the Vertebral Column ...	1	2	3	1	1	2
35. Tuberculosis of Bones and Joints ...	...	1	1	1	...	1
36. Tuberculosis of other Organs—						
(a) Skin or Subcutaneous Tissue (Lupus) ...	...	1	1	...	...	2
(b) Bones ...	...	...	...	...	...	...
(c) Lymphatic System ...	...	3	3	...	...	7
(d) Genito-urinary ...	...	...	...	...	...	...
(e) Other organs ...	...	...	...	...	...	...
37. Tuberculosis disseminated—						
(a) Acute ...	...	...	...	...	...	...
(b) Chronic ...	...	...	...	...	...	...
38. Syphilis—						
(a) Primary ...	...	23	23	...	1	139
(b) Secondary ...	1	13	14	...	2	280
(c) Tertiary ...	4	30	34	...	2	180
(d) Hereditary... ..	...	...	...	...	...	82
(e) Period not indicated ...	...	8	8	1	...	26
(f) Latent ...	...	...	...	...	...	...

TABLES V AND VI.—*contd.*

DISEASES	TABLE V					TABLE VI
	Remaining in Hospital at end of 1933	Yearly Admissions	Total Cases Treated	Total Deaths	Remaining in Hospital at end of 1934	All Cases including both In- and Out- Patients
I. EPIDEMIC, ENDEMIC, AND INFECTIOUS DISEASES— <i>contd.</i>						
39. Soft Chancre	...	2	2	...	...	49
40. A.—Gonorrhœa and its complications	2	33	35	...	1	1,602
B.—Stricture	...	...	...	...	...	...
C.—Stricture and Extravasation	...	...	...	...	...	...
D.—Gonorrhœal Ophthalmia	...	4	4	...	...	16
E.—Gonorrhœal Arthritis	2	25	27	...	1	138
F.—Salpingitis, etc.	...	...	...	...	...	...
G.—Granuloma Venereum	...	1	1	...	...	1
41. Septicæmia	...	23	23	4	1	40
42. Other Infectious Diseases	5	27	32	...	...	306
II. GENERAL DISEASES NOT MENTIONED ABOVE.						
43. Cancer or other malignant Tumours of the Buccal Cavity	...	5	5	3	1	6
44. Cancer or other malignant Tumours of the Stomach or Liver	...	8	8	2	...	8
45. Cancer or other malignant Tumours of the Peritoneum Intestines, Rectum	...	1	1	1	...	1
46. Cancer or other malignant Tumours of the Female Genital Organs	...	1	1	1	...	1
47. Cancer or other malignant Tumours of the Breast	...	1	1	1	...	3
48. Cancer or other malignant Tumours of the Skin	...	...	...	...	...	...
49. Cancer or other malignant Tumours of organs not specified	...	6	6	3	...	6
50. Tumours non-malignant	1	20	21	1	1	80
51. Acute Rheumatism	...	1	1	...	...	127
52. Chronic Rheumatism	...	4	4	...	...	306
52A. Myalgia	...	...	...	...	...	...
53. Scurvy (including Barlow's Disease)	...	...	...	...	...	...
54. Pellagra	...	...	...	...	...	...
55. Beri-Beri	1	18	19	...	...	48
56. Rickets	...	...	...	...	...	3
57. Diabetes (not including Insipidus)	3	14	17	2	2	44
58. Anæmia—						
(a) Pernicious	...	...	...	...	...	...
(b) Other Anæmias and Chlorosis	...	3	3	...	...	898
59. Diseases of the Pituitary Body	...	...	...	...	...	1
60. Diseases of the Thyroid Gland—						
(a) Exophthalmic Goitre	...	...	...	...	...	1
(b) Other diseases of the Thyroid gland, Myxœdema	...	1	1	...	...	5
(c) Others	...	...	...	...	...	...
61. Diseases of the Para-Thyroid Glands	...	1	1	...	...	1
62. Diseases of the Thymus	...	...	...	...	...	...
63. Diseases of the Supra-Renal Glands	...	...	...	...	...	...
64. Diseases of the Spleen	...	6	6	1	...	557
65. Leukæmia—						
(a) Leukæmia	...	...	...	...	...	...
(b) Hodgkin's Disease	...	1	1	1	...	1
66. Alcoholism	...	2	2	...	...	6
67. Chronic poisoning by mineral substances (leads, mercury, etc.)	...	...	...	...	...	...
68. Chronic poisoning by organic substances (morphia, cocaine, etc.)	...	1	1	...	...	1
69. Other general diseases—						
Auto-intoxication	...	3	3	1	...	3
Purpura Hæmorrhagica	...	...	...	...	...	...
Hæmophilia	...	...	...	...	...	...
Diabetes Insipidus	...	...	...	...	...	2
Others	1	...	1	...	...	4
III. AFFECTIONS OF THE NERVOUS SYSTEM AND ORGANS OF THE SENSES.						
70. Encephalitis (not including Encephalitis Lethargica)	...	...	...	...	...	...
71. Meningitis (not including Tuberculous Meningitis or Cerebro- spinal Meningitis)	...	4	4	4	...	4
72. Locomotor Ataxia	...	3	3	...	...	3
73. Other affections of the Spinal Cord	1	2	3	...	1	6
74. Apoplexy—						
(a) Hæmorrhage	...	7	7	5	...	8
(b) Embolism	...	1	1	...	...	1
(c) Thrombosis	...	...	...	...	...	...
75. Paralysis—						
(a) Hemiplegia	1	1	2	...	...	18
(b) Other paralyses	6	11	17	4	8	17
76. General Paralysis of the Insane	...	1	1	1	...	9
77. Other forms of Mental Alienation	...	5	5	...	1	13
78. Epilepsy	...	4	4	1	...	13
79. Eclampsia Convulsions (non-puerperal) 5 years or over	...	...	...	...	...	2
80. Infantile Convulsions	...	...	...	...	...	...
81. Chorea	...	...	...	...	...	...
82. A.—Hysteria	...	4	4	...	...	6
B.—Neuritis	4	20	24	...	...	82
C.—Neurasthenia	...	4	4	...	...	12
83. Cerebral Softening	...	...	...	...	...	...
84. Other affections of the Nervous System, such as Paralysis Agitans, Headache, Neuralgia, Insomnia, etc.	...	2	2	...	...	2,349

TABLES V AND VI.—*contd.*

DISEASES	TABLE V					TABLE VI
	Remaining in Hospital at end of 1933	Yearly Admissions	Total Cases Treated	Total Deaths	Remaining in Hospital at end of 1934	Ali Cases including both In- and Out- Patients
III. AFFECTIONS OF THE NERVOUS SYSTEM AND ORGANS OF THE SENSES— <i>contd.</i>						
85. Affections of the Organs of Vision—						
(a) Conjunctivitis	...	6	6	...	...	822
(b) Trachoma	...	5	5	...	...	8
(c) Tumours of the Eye	...	...	...	...	...	19
(d) Iritis	...	4	4	...	...	100
(e) Other affections of the Eye	3	40	43	...	1	2,688
86. Affections of the Ear or Mastoid Sinus	...	...	...	...	...	1,629
(a) Otitis Media	...	10	10	...	...	266
(b) Others	1	5	6	...	...	380
IV. AFFECTIONS OF THE CIRCULATORY SYSTEM.						
87. Pericarditis	...	...	...	...	...	1
88. Acute Endocarditis	...	5	5	1	...	9
89. Angina Pectoris	...	...	...	...	...	...
90. Other Diseases of the Heart	...	...	...	...	...	...
(a) Valvular—						
Mitral	...	10	10	1	1	15
Aortic	...	3	3	...	...	5
Tricuspid	...	...	...	...	...	...
Pulmonary	...	...	...	...	...	...
Mixed or unspecified	...	...	...	...	...	...
(b) Myocarditis	5	15	20	9	...	33
D.A.H.	...	1	1	...	...	10
Others	1	1	2	...	...	2
91. Diseases of the Arteries	...	...	...	...	...	...
(a) Aneurism	...	3	3	...	1	4
(b) Arterio-Sclerosis	...	...	...	...	...	...
(c) Other diseases	...	...	...	...	...	1
92. Embolism or Thrombosis (non-cerebral)	...	1	1	...	...	2
93. Diseases of the Veins—						
Hæmorrhoids	4	38	42	...	...	152
Varicose Veins	...	6	6	...	...	15
Phlebitis	...	1	1	...	...	2
94. Diseases of the Lymphatic System—						
Lymphangitis	2	20	22	...	...	145
Lymphadenitis, Bubo (non-specific)	6	112	118	2	6	555
Others	...	...	...	...	...	...
95. Hæmorrhage of undetermined cause	...	2	2	...	...	13
96. Other affections of the Circulatory System	...	...	...	...	...	5
V. AFFECTIONS OF THE RESPIRATORY SYSTEM.						
97. Diseases of the Nasal Passages and accessory sinuses—	...	...	...	...	...	1,450
Adenoids	...	3	3	...	...	7
Polypus	...	2	2	...	...	8
Rhinitis	...	4	4	...	...	40
Coryza	...	1	1	...	...	690
Others	...	2	2	1	...	9
98. Affections of the Larynx—						
Laryngitis	...	2	2	...	...	39
Tracheitis	...	...	...	...	...	...
99. Bronchitis—						
(a) Acute	3	38	41	3	1	6,903
(b) Chronic	...	17	17	...	1	428
100. Broncho-Pneumonia	1	20	21	2	1	40
101. Pneumonia—						
(a) Lobar	1	66	67	18	4	106
(b) Unclassified	...	9	9	...	...	24
102. Pleurisy	3	24	27	1	2	69
102A. Empyema	...	7	7	1	...	23
103. Congestion of the Lungs	...	...	...	...	...	...
104. Gangrene of the Lungs	...	1	1	1	...	1
105. Asthma	1	16	17	2	...	419
106. Pulmonary Emphysema	...	...	...	...	...	1
107. Other affections of the Lungs—						
Pulmonary Spirochaetosis	...	6	6	1	2	9
Others	...	...	...	...	...	5
VI. DISEASES OF THE DIGESTIVE SYSTEM.						
108. A.—Diseases of the Teeth or Gums—	...	...	...	...	...	...
Caries	...	5	5	...	...	6,386
Pyorrhœa	...	...	...	...	...	152
Others	...	7	7	...	...	71
B.—Other affections of the Mouth—						
Stomatitis	...	5	5	1	...	121
Glossitis	...	4	4	...	...	39
Others	...	1	1	1	...	136
109. Affections of the Pharynx or Tonsils—						
Tonsillitis	...	20	20	...	...	439
Pharyngitis	1	...	1	...	...	859
Others	...	...	...	...	...	60

TABLES V AND VI.—*contd.*

DISEASES	TABLE V					TABLE VI
	Remaining in Hospital at end of 1933	Yearly Admissions	Total Cases Treated	Total Deaths	Remaining in Hospital at end of 1934	All Cases including both In- and Out- Patients
VI. DISEASES OF THE DIGESTIVE SYSTEM— <i>contd.</i>						
110. Affections of the Œsophagus ...	...	...	...	...	...	...
111. A.—Ulcer of the Stomach ...	...	1	1	...	...	3
B.—Ulcer of the Duodenum ...	2	12	14	2	...	21
112. Other affections of the Stomach						
Gastritis ...	...	7	7	...	...	33
Dyspepsia ...	...	2	2	...	...	1,066
Others ...	...	8	8	2	1	35
113. Diarrhœa and Enteritis—						
Under two years of age ...	...	1	1	...	...	173
114. Diarrhœa and Enteritis—						
Two years of age and over ...	...	46	46	9	...	1,276
Colitis ...	1	11	12	...	1	37
Ulceration ...	...	1	1	...	...	4
114. Colic ...	...	17	17	...	...	668
114A. Sprue ...	...	...	...	...	...	...
115. Ankylostomiasis ...	13	188	201	17	20	13,665
116. Diseases due to Intestinal Parasites—						
(a) Cestoda (Taenia) ...	...	2	2	...	...	4
(b) Trematoda (Flukes) ...	...	...	...	...	...	...
(c) Bilharzia ...	...	...	...	...	...	...
(d) Nematoda (other than Ankylostoma)						
Ascaris ...	...	...	...	...	...	168
Trichocephalus dispar. ...	...	...	...	...	...	3
Trichina ...	...	...	...	...	...	...
Dracunculus ...	...	...	...	...	...	...
Strongylus ...	...	...	...	...	...	4
Oxyuris ...	...	...	...	...	...	7
(e) Coccidia ...	...	...	...	...	...	...
(f) Other parasites ...	...	...	...	...	...	...
(g) Unclassified ...	...	...	...	...	...	...
117. Appendicitis ...	...	16	16	2	1	20
118. Hernia ...	10	230	240	16	8	386
119. A.—Affections of the Anus and Rectum—						
Fistula ...	3	15	18	1	1	29
Others ...	...	10	10	...	1	14
B.—Other affections of the Intestines—						
Enteroptosis ...	...	4	4	3	...	6
Constipation ...	1	7	8	...	...	12,532
Others ...	...	2	2	...	...	7
120. Acute Yellow Atrophy of the Liver ...	...	...	...	...	...	1
121. Hydatid of the Liver ...	...	...	...	...	...	...
122. Cirrhosis of the Liver—						
(a) Alcoholic ...	...	...	...	...	...	...
(b) Other forms ...	...	9	9	2	2	25
123. Biliary Calculus ...	...	...	...	...	...	...
124. Other affections of the Liver—						
Abscess ...	...	...	...	...	...	...
Hepatitis ...	1	7	8	...	...	34
Cholecystitis ...	1	9	10	1	...	19
Jaundice ...	...	4	4	...	...	47
Others ...	...	...	...	...	...	1
125. Diseases of the Pancreas ...	...	1	1	...	...	1
126. Peritonitis (of unknown cause) ...	...	5	5	4	...	7
127. Other affections of the Digestive System ...	...	1	1	...	...	3
VII. DISEASES OF THE GENITO-URINARY SYSTEM (NON- VENEREAL).						
128. Acute Nephritis ...	...	11	11	4	2	38
129. Chronic Nephritis ...	2	15	17	5	1	27
130. A.—Chyluria ...	...	2	2	2	...	8
B.—Schistosomiasis ...	...	21	21	...	1	832
131. Other affections of the Kidneys and Ureters—						
Pyelitis ...	...	35	35	1	1	49
Others ...	...	1	1	1	...	21
132. Urinary Calculus... ..	...	1	1	...	...	2
133. Diseases of the Bladder -						
Cystitis ...	1	10	11	...	1	82
Others ...	...	7	7	1	...	70
134. Diseases of the Urethra—						
(a) Stricture ...	2	36	38	4	...	88
(b) Other ...	4	31	35	3	2	38
135. Diseases of the Prostate—						
Hypertrophy ...	1	14	15	2	...	17
Prostatitis ...	...	3	3	...	...	10
136. Diseases (non-Venereal) of the Genital Organs of Man—						
Epididymitis ...	4	43	47	4	2	103
Orchitis ...	1	26	27	3	2	368
Hydrocele ...	11	228	239	2	18	465
Ulcer of Penis... ..	...	4	4	...	...	497
Varicocele ...	...	...	...	...	...	...
Others ...	3	43	46	...	...	372

TABLES V AND VI.—*contd.*

DISEASES	TABLE V					TABLE VI
	Remaining in Hospital at end of 1933	Yearly Admissions	Total Cases Treated	Total Deaths	Remaining in Hospital at end of 1934	All C including both In- and Out- Patients
137. Cysts or other non-malignant Tumours of the Ovaries ...	...	8	8	1	1	10
VII. DISEASES OF THE GENITO-URINARY SYSTEM (NON- VENEREAL)— <i>contd.</i>						
138. Salpingitis—						
Abscess of the Palvis ...	...	15	15	...	...	55
139. Uterine Tumours (non-malignant) ...	1	14	15	1	...	31
140. Uterine Hæmorrhage (non-puerperal) ...	...	1	1	...	...	3
141. A.—Metritis ...	...	10	10	...	1	11
B.—Other affections of the Female Genital Organs—						
Displacement of Uterus ...	...	12	12	...	2	219
Amenorrhœa ...	...	...	...	...	...	15
Dysmenorrhœa ...	...	2	2	...	...	22
Leucorrhœa ...	...	1	1	...	...	13
Others ...	2	9	11	...	...	75
142. Diseases of the Breast (non-puerperal)—						
Mastitis ...	...	1	1	...	1	42
Abscess of Breast ...	...	4	4	...	...	6
Others ...	...	8	8	...	...	40
VIII. PUERPERAL STATE.						
143. A.—Normal Labour ...	3	43	46	...	2	26
143. A. Delayed Labour ...	...	4	4	1	...	4
B.—Accidents of Pregnancy—						
(a) Abortion or Miscarriage ...	...	13	13	1	...	14
(b) Ectopic Gestation ...	...	...	...	...	...	...
(c) Other accidents of Pregnancy ...	...	6	6	2	...	18
C. Ante-natal supervision ...	...	...	...	...	...	33
144. Puerperal Hæmorrhage ...	...	4	4	...	...	5
145. Other accidents of Parturition ...	...	3	3	1	...	6
146. Puerperal Septicæmia ...	...	6	6	2	1	6
147. Phlegmasia Dolens ...	1	1	2	1	...	1
148. Puerperal Eclampsia ...	...	2	2	1	...	2
149. Sequelæ of Labour ...	...	...	...	...	...	...
150. Puerperal affections of the Breast ...	...	...	...	...	...	...
IX. AFFECTIONS OF THE SKIN AND CELLULAR TISSUES.						
151. Gangrene ...	1	14	15	5	1	35
152. Boil ...	...	...	...	...	...	1,116
Carbuncle ...	5	5	10	1	...	37
153. Abscess ...	...	87	87	2	...	1,190
Whitlow and Onychia ...	1	37	38	...	13	532
Cellulitis ...	...	45	45	3	3	1,023
154. A.—Tinea ...	...	...	...	...	...	938
B.—Scabies ...	...	3	3	...	...	10,539
155. Other Diseases of the Skin—						
Erythema ...	...	3	3	...	...	372
Urticaria ...	...	...	...	...	...	35
Eczema ...	...	6	6	...	1	705
Herpes ...	...	1	1	...	...	94
Psoriasis ...	...	...	...	...	...	8
Elephantiasis ...	4	29	33	2	5	118
Myiasis ...	...	...	...	...	...	9
Chiggers ...	...	1	1	...	...	583
Cutaneous Leishmaniasis...	...	1	1	...	...	3
Ulcers ...	13	190	203	...	12	13,082
Others ...	...	15	15	...	3	1,362
X. DISEASES OF THE BONES AND ORGANS OF LOCOMOTION (OTHER THAN TUBERCULOUS)—						
156. Diseases of the Bones—						
Osteitis ...	1	4	5	1	...	17
Periostitis ...	...	...	...	...	...	...
Others ...	...	11	11	...	1	20
157. Diseases of Joints—						
Arthritis ...	...	19	19	...	4	847
Synovitis ...	...	13	13	...	...	141
Others ...	...	...	...	...	...	...
158. Other diseases of Bones or Organs of Locomotion—						
(a) Teno-synovitis ...	...	...	...	...	...	...
(b) Ganglion ...	...	4	4	...	...	29
(c) Others ...	...	30	30	...	6	2,351
XI. MALFORMATIONS.						
159. Malformations—						
Hydrocephalus ...	...	...	...	...	...	1
Hypospadias ...	...	...	...	...	...	...
Spina Bifida ...	...	...	...	...	...	...
Others ...	...	2	2	...	...	6
XII. DISEASES OF INFANCY.						
160. Normal living babies ...	...	...	...	...	...	...
160A. Congenital Debility ...	...	...	...	...	...	14
161. Premature Birth...	...	...	...	...	...	1

TABLES V AND VI.—*contd.*

DISEASES	TABLE V					TABLE VI
	Remaining in Hospital at end of 1933	Yearly Admissions	Total Cases Treated	Total Deaths	Remaining in Hospital at end of 1934	All Cases including both In- and Out- Patients
162. Other affections of Infancy	1	3	4	1	1	10
162A. Babies still-born	...	...	...	...	...	...
163. Infant neglect (infants of three months or over) ...	...	...	...	...	...	...
XIII. AFFECTIONS OF OLD AGE.						
164. Senility	77	137	214	75	64	236
Senile Dementia	...	...	...	...	...	...
XIV. AFFECTIONS PRODUCED BY EXTERNAL CAUSES.						
165. Suicide by Poisoning	...	...	...	...	...	...
166. Corrosive Poisoning (intentional)	...	2	2	2	...	2
167. Suicide by Gas Poisoning	...	...	...	...	...	...
168. Suicide by Hanging or Strangulation	...	...	...	...	...	1
169. Suicide by Drowning	...	4	4	1	...	4
170. Suicide by Firearms	...	...	...	...	...	...
171. Suicide by cutting or stabbing instruments	...	...	...	...	...	...
172. Suicide by jumping from a height	...	1	1	...	...	1
173. Suicide by crushing	...	...	...	...	...	...
174. Other suicides	...	...	...	...	...	...
175. Food Poisoning—	...	3	3	...	...	4
Botulism	...	...	...	...	...	...
176. Attacks of poisonous animals—	...	...	...	...	...	...
Snake Bite	...	2	2	...	...	16
Insect Bite	...	1	1	...	...	70
177. Other accidental Poisonings... ..	...	3	3	...	...	16
178. Burns (by fire)	2	27	29	7	...	489
179. Burns (other than by fire)	...	1	1	...	...	43
180. Suffocation (accidental)	...	...	...	...	...	...
181. Poisoning by Gas (accidental)	...	...	...	...	...	...
182. Drowning (accidental)	...	...	...	...	...	7
183. Wounds (by Firearms, war excepted)	...	...	...	...	...	...
184. Wounds (by cutting or stabbing instruments)	6	99	105	5	3	3,160
185. Wounds (by fall)... ..	...	106	106	...	6	2,596
186. Wounds (in Mines or Quarries)	...	1	1	...	...	9
187. Wounds (by Machinery)	...	8	8	...	...	39
188. Wounds (crushing, <i>e.g.</i> , railway accidents, etc.)	...	1	1	...	...	94
189. Injuries inflicted by Animals, Bite, Kicks, etc.)	...	4	4	...	...	148
190. Wounds inflicted on Active Service	...	...	...	...	...	...
191. Executions of civilians by belligerents... ..	...	...	...	...	...	...
192. A.—Over fatigue... ..	...	...	...	...	...	...
B.—Hunger or Thirst	...	...	...	...	...	...
193. Exposure to Cold, Frost bite, etc	...	...	...	...	...	3
194. Exposure to Heat—	...	...	...	...	...	...
Heatstroke	...	...	...	...	...	1
Sunstroke	...	...	...	...	...	1
195. Lightning Stroke... ..	...	...	...	...	...	3
196. Electric Shock	...	...	...	...	...	...
197. Murder by Firearms	...	...	...	...	...	...
198. Murder by cutting or stabbing instruments	...	...	...	...	...	...
199. Murder by other means	...	...	...	...	...	...
200. Infanticide (murder of an infant under one year)... ..	...	...	...	...	...	...
201. A.—Dislocation	...	10	10	1	...	62
B.—Sprain	...	5	5	...	...	437
C.—Fracture	9	54	63	3	8	108
202. Other external Injuries	1	12	13	...	1	3,701
203. Deaths by Violence of unknown case	...	...	...	...	...	...
XV. ILL-DEFINED DISEASES.						
204. Sudden Death (cause unknown)	...	...	...	...	...	...
205. A.—Diseases not already specified or ill-defined—	...	...	...	...	...	...
Ascites	...	...	...	...	...	8
Oedema	...	...	...	...	...	54
Asthenia	12	130	142	41	23	1,084
Shock	...	3	3	...	...	6
Hyperpyrexia	...	...	...	...	...	1
B.—Malingering	...	9	9	...	1	9
XVI. DISEASES, THE TOTAL OF WHICH HAVE NOT CAUSED 10 DEATHS, INCLUDING P.U.O. AND N.Y.D.						
...	...	40	40	6	2	2,960
Total, Sections I to XVI... ..	329	3,878	4,207	418	346	130,115
Examinations	...	...	...	...	...	2,471
GRAND TOTAL	329	3,878	4,207	418	346	132,586

APPENDIX I.
REGISTRATION OF MEDICAL PRACTITIONERS, DENTISTS AND
DRUGGISTS.

At the beginning of the year there were on the Register 28 medical practitioners, 6 dentists and 21 druggists; at the end of the year 24 registered medical practitioners, 9 licensed medical practitioners, 5 dentists and 19 druggists. Actually resident in the Protectorate at the end of the year there were 20 registered medical practitioners, 8 licensed medical practitioners, 2 dentists and 19 druggists of whom 10 registered medical practitioners, 8 licensed medical practitioners, 5 druggists and 1 dentist were in Government Service.

APPENDIX II.
CONTROL OF OPIUM.

The following are the particulars regarding opium addicts:—

	1933.		1934.		1935.	
	M.	F.	M.	F.	M.	F.
Number of opium addicts remaining from the previous year	... 55	22	51	19	42	16
Number of applications for permit during the year	... 5	—	2	—	5	—
Number of permits granted during the year	... 5	—	1	—	4	—
Number of permits refused during the year	... —	—	1	—	1	—
Number of permits cancelled:—						
(a) owing to deaths	... —	3	2	1	—	1
(b) owing to other cause	... 9	—	8	2	5	—
Number of opium addicts remaining at the end of the year	... 51	19	42	16	41	15
	ozs.		ozs.		ozs.	
Amount of opium issued to addicts during the year	... 448		424		392½	
	Rs. Cts.		Rs. Cts.		Rs. Cts.	
Amount received in payment for opium issued	... 2,801-87		2,651-25		2,405-00	

APPENDIX III.
DENTAL SURGEON'S REPORT.

During 1935 the amount of Dental work done was equal to the work done during 1394 with greater time given to the clinical and conservative work in the schools.

The native out-patient hour has again proved successful and popular.

Wherever possible the sub-assistant surgeons have been given demonstrations in extractions, and a course of lectures and demonstrations will be given shortly to the S.A.S. and African assistants so that when I am away in Pemba the Dental out-patients may still be carried on.

Pemba has been visited twice this year but more time will be given to Pemba in the future.

The work done in the Schools is reported upon in the section on School Hygiene.

Other work done during 1935 was as follows:—

Appointments made	...	1,093	
Fillings	...	469	
Extractions in surgery	321		
Schools	704		
Native out-patient	2,148		
		...	3,173
Treatments and scale and polish	...	275	
Root fillings	...	14	
Examinations	...	1,102	

